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A STUDY OF STANDARDIZED PERSONALITY TESTS AND SKILL IN SPEECH[1]

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PURPOSE AND METHOD

The immediate purpose of this study is to determine to what extent good and poor student speakers differ in respect to their responses to certain "personality tests" now being used in educational and vocational guidance. Many such tests have been developed by psychologists, and nominally measure such traits as: Emotional adjustment, social adjustment, inferiority feelings, introversion and extroversion, morale, vocational interests, masculinity or femininity of interests and attitudes, adjustment to the home, and adjustment to health.

There are, perhaps, good theoretical reasons for expecting that good and poor speakers differ somewhat in their responses in such categories of experience. Many teachers of speech, particularly those engaged in clinical work, have stressed the importance of the emotional adjustment of the speaker at the moment of speaking. From their point of view the speaker's rapport with his audience and, therefore, his general effectiveness are determined in a large measure by his attitudes toward his audience and toward himself. Moreover, his overt mannerisms, including such characteristics as the quality of his voice, the rate of speech, posture, diction, fluency, etc., are regarded as symptoms of degrees of internal emotional organization or disorganization.

Although teachers differ in regard to their treatment of personality problems in speech, few would deny their existence, or minimize the

[1] The authors are indebted for assistance in this study to workers supplied by The Works Progress Administration, Project No. 5209, Sub-Project No. 96.

causative importance of emotional attitudes in determining a speaker's effectiveness.

This broadened view of speech ability is more or less concurrent in its development with the construction of personality tests in psychology. To date no broad research has been reported on the extent to which the formal tests measure significant factors in speech ability. To what extent, for example, does a favorable score on one of the existing psychological tests of social adjustment reflect a high degree of expressiveness in a situation requiring the subject to speak? Differing as they do in origin, the two conceptions of good social adjustment may show little relationship. However, it is quite reasonable to suppose that some of the items as well as total scores of the tests will show significant differentiation between good and poor speakers, and it is specifically for the purpose of discovering such items and test scores that this study has been made.

The subjects used in the studies reported here were students in the Fundamentals of Speech Course at the University of Minnesota. Their age and class distributions are shown in Tables I and II.

TABLE I.—AGE DISTRIBUTION (PER CENT)

Age	Women	Men
27 or over	3	0
26	0	2
25	0	1
24	3	1
23	2	5
22	5	11
21	9	16
20	24	26
19	38	31
18	13	6
17	3	0
16	0	1
	100	100

It will be observed that in age a large majority, about eighty per cent, range from eighteen to twenty-one years, and that most of them, about eighty per cent, are sophomores and juniors. They represent a fairly broad sampling of the various pre-professional college groups. For most of these students, Speech was an elective course.

TABLE II.—CLASS DISTRIBUTION (PER CENT)

	Women	Men
Graduate	2	0
Senior	10	12
Junior	26	17
Sophomore	55	67
Freshmen	7	4
	100	100

The procedure of the studies involved five general steps: First, the selection of criterion groups, *i.e.*, good and poor speakers; second, the giving of the personality tests to the subjects; third, the computation of critical ratios for criterion groups differences on raw test scores; fourth, item analysis of the tests to discover differences in the responses of the criterion groups; fifth, correlation of test scores with indexes of speech skill.

The method of selecting the good and poor speakers was as follows. During the early weeks of the first quarter of the Fundamentals of Speech Course, two instructors heard the students deliver a three-minute speech involving the statement of a positive opinion. The instructors rated each on a nine-point graphic rating scale for "General Effectiveness" in performance.

The ratings of the two instructors on general effectiveness were averaged to provide the first index of speech skill. A second index was the grade given to each student by his instructor at the close of the first quarter. These grades ranged from "A" for highest quality work down the alphabet to "F" for work of the poorest quality.

The selection of criterion groups, as well as the item analysis, were carried on separately for men and women. The fifty subjects of each sex receiving the highest average rating by the two instructors and who throughout the first quarter of the course maintained an average grade of "B" or higher were designated as the good speaker group. Since there were two hundred subjects in most of the experimental groups, and in none less than one hundred sixty subjects, this good speaker group will be identified hereafter in this report as the Q4 criterion group. The fifty subjects of each sex receiving the lowest average rating by the instructors, and who received an average grade throughout the first quarter of the course of "C" or lower were designated as

the poor speaker group. These cases shall be referred to as the Q1 criterion group.

The extent of the individual differences in speech skill among these students was sufficient to produce sharp differences between those designated as "good" and those designated as "poor" speakers. The raw correlation between instructors' ratings for four hundred subjects was $+.62 \pm .021$. The reliability of these ratings when combined by the Brown-Spearman formula was $+.77$. The raw correlation between instructors for the men subjects was $+.58 \pm .032$ and for women subjects was $+.65 \pm .033$. When corrected for combination of the ratings of two instructors they become $+.73$ and $+.72$, respectively. When the second criterion of "grades" is used to supplement ratings of these reliabilities, the total reliability of the outside criterion must be recognized to be reasonably high. In regard to the size of the difference between the criterion groups it may be said that the average rating of the Q1 (poor) men was 4.08, whereas the average rating of the Q4 (good) men was 7.06; the difference yielding a critical ratio of 18.00. The average rating for the Q1 women was 3.86 compared with 6.84 for Q4 women. The critical ratio in this instance is 27.00. Grades were transposed into numerical scores and critical ratios computed for criterion groups differences on that basis. They were 13.25 for men and 16.25 for women.

The subjects in these studies were required to take at least two quarters of speech. So it was possible to examine the grades which they received in the second quarter to discover to what extent the Q1 and Q4 criterion groups differed in respect to the grades received at the end of their second quarter in the course. Table III shows the

TABLE III.—SECOND QUARTER GRADES FOR CRITERION CASES

Grade	Women		Men	
	Q1 Per cent	Q4 Per cent	Q1 Per cent	Q4 Per cent
A	0	23	0	24
B	12	59	9	58
C	81	18	86	18
D	7	0	5	0

percentages of the various criterion groups receiving "A," "B," "C," and "D," in the second quarter. The tabulation indicates that at the

close of the second quarter the criterion groups are still different in respect to speech skill, and supports the evidence previously presented that the original designation of the groups was based upon reasonably accurate observation.

In addition to the personality tests subjected to item analysis in this study, the main group of subjects took other tests, and some of these tests also showed significant differences in comparing criterion groups. The additional tests are listed below.

A-1 Speech Attitude Scale
A-2 Speech Experience Inventory
B-1 Minnesota College Aptitude Test
B-2 Minnesota College Aptitude Rating (Average of College Aptitude and High-School Scholarship Percentiles)
C-1 Time Contemporary Affairs Test

TABLE IV.—MEANS AND SIGNIFICANCE OF MEANS DIFFERENCES ON SUPPLEMENTARY TESTS FOR CRITERION GROUPS

	Q1 Men		Q4			Q1 Women		Q4		
	Mean	SD	Mean	SD	CR	Mean	SD	Mean	SD	CR
A-1	286.12	45.20	326.39	44.40	4.51	278.92	43.40	315.90	39.40	4.48
A-2	125.00	28.40	146.30	25.00	3.98	121.20	22.40	150.71	23.30	6.42
B-1	51.75	30.30	69.65	20.60	3.46	55.00	30.50	67.22	24.70	2.19
B-2	56.14	20.00	70.33	17.40	3.51	66.38	19.30	75.25	15.40	2.50
C-1	52.44	15.84	55.20	14.46	.91	38.56	14.88	40.54	12.80	.71

It will be observed from Table IV that the scores of the Speech Attitude Scale and the Speech Experience Inventory[1] show a significant difference for men and for women, indicating that the Q4 subjects have better speech attitudes and more speech experience than have the Q1 subjects. The table also shows higher college aptitude for the Q4 subjects than the Q1 subjects, although the criterial ratios are not high for the women. The scores for the Time Contemporary Affairs Test (A. C. Eurich and E. C. Wilson) show negligible differences between the criterion groups.

COMPARISON OF CRITERION GROUPS ON PSYCHOLOGICAL TEST SCORES

The following personality tests were given to the subjects in the main study:

[1] Knower, F. H.: C. H. Stoelting Company, Chicago, Illinois.

(1) *The Adjustment Inventory.*—Hugh M. Bell, Stanford University Press, Stanford University, California.

(2) *The Minnesota Inventory of Social Behavior.*—E. G. Williamson and J. G. Darley, Psychological Corporation, New York City.

(3) *The Personality Inventory.*—Robert G. Bernreuter, Stanford University Press, Stanford University, California.

(4) *Vocational Interest Blank.*—Edward K. Strong, Stanford University Press, Stanford University, California.

(5) *Attitude-Interest Analysis Test.*—L. M. Terman and C. C. Miles, McGraw-Hill Book Company, New York City.

(6) *Minnesota Scale for the Survey of Opinions.*—E. A. Rundquist and R. F. Sletto, University of Minnesota Press, University of Minnesota, Minneapolis, Minnesota.

These tests are indexed on the following page according to the various scores which they provide and comparisons of the average scores for the criterion groups are presented in Table V.

An examination of this table reveals seven critical ratios which reach or exceed 3.00. Two of these significant ratios emerge from the comparison of the criterion groups with respect to Social Adjustment as measured by the Bell Adjustment Inventory (1-C). The average scores are such as to indicate that the good speakers as a group have better social adjustment than have the poor speakers. In respect to adjustment to home, health, and in regard to emotional adjustment as measured by the same test there is little evidence of difference, although a fairly high critical ratio appears in the comparison of Q1 and Q4 women in average health scores.

Two of the critical ratios which reach or exceed 3.00 are found in the comparison of group averages of scores for the Minnesota Inventory of Social Behavior (2-A). Here again the good speaker group exhibits a more favorable social adjustment than the poor speaker group according to the test scores. Another significant critical ratio appears in the comparison of Q1 and Q4 men with respect to Vocational Interest in Engineering (4-B). According to the norms published by the author of the test (see Test scoring key), both of the criterion groups fall in class "C," which may be interpreted to mean there is no similarity of professional interests with Engineers. In quantitative terms, however, the average score for the Q1 men is nearer to that of Engineers than is that of the Q4 men.

A significant critical ratio also appears in the comparison of Q1 and Q4 men with respect to masculinity of interests as measured by

INDEX OF PSYCHOLOGY TEST IN THE ITEM ANALYSIS

Key number	Name of test	Trait tested
1-A	The Adjustment Inventory	Home
1-B	The Adjustment Inventory	Health
1-C	The Adjustment Inventory	Social
1-D	The Adjustment Inventory	Emotional
2-A	The Minnesota Inventory	Social Behavior
3-A	The Personality Inventory	Emotional
3-B	The Personality Inventory	Self-Sufficiency
3-C	The Personality Inventory	Introversion
3-D	The Personality Inventory	Dominance
3-E	The Personality Inventory	Confidence
3-F	The Personality Inventory	Sociality
4-A	Vocational Interest Blank	Artist
4-B	Vocational Interest Blank	Engineer
4-C	Vocational Interest Blank	Lawyer
4-D	Vocational Interest Blank	Masculinity-Femininity (Men)
4-E	Vocational Interest Blank	Teacher of English
4-F	Vocational Interest Blank	Teacher in General
4-G	Vocational Interest Blank	Office Worker
4-H	Vocational Interest Blank	Social Worker
4-I	Vocational Interest Blank	Masculinity-Femininity (Women)
5-A	Attitude-Interest Analysis Test	Masculinity-Femininity (Women)
6-A	Minnesota Survey of Opinions	Morale
6-B	Minnesota Survey of Opinions	Inferiority Feelings
6-C	Minnesota Survey of Opinions	General Adjustment

the Vocational Interest Blank (4-D). According to the published norms the average masculinity score for the Q1 men corresponds to the 47th percentile for men, whereas the average masculinity score for the Q4 men corresponds to the 30th percentile for men. It may be said, therefore, that, whereas the poor speakers are normally masculine in their interests, the good speakers tend toward femininity of interests, according to the Strong Test. Another significant ratio is the one emerging from the comparison of Q1 and Q4 women with respect to their Vocational Interest in the teaching of English (4-E). According to the published norms for the test, the Q1 group receives a "C+" classification, whereas the Q4 group receives a "B" classification.

The averages for the Bernreuter Personality Inventory scores do not yield significant critical ratios. The means suggest that the Q1 subjects are more neurotic (c-A) than the Q4 subjects, but the ratios are

TABLE V.—MEANS AND SIGNIFICANCE OF MEAN DIFFERENCES FOR CRITERION GROUPS ON PSYCHOLOGICAL TESTS

	Men					Women				
	Q1		Q4			Q1		Q4		
	Mean	SD	Mean	SD	CR	Mean	SD	Mean	SD	CR
1-A	6.26	4.44	6.20	4.82	.06	8.07	6.08	7.17	5.10	.80
1-B	7.19	3.88	6.89	3.54	1.76	7.09	4.26	9.04	4.88	2.13
1-C	11.95	5.60	7.27	5.12	4.30	13.90	6.92	9.06	5.72	3.80
1-D	8.05	4.82	8.07	5.46	.02	12.76	7.74	11.81	6.74	.66
2-A	135.78	19.20	149.28	15.90	3.81	135.21	16.60	146.21	18.30	3.14
3-A	−70.98	76.40	−97.62	81.80	1.07	−32.14	82.80	−46.80	94.60	.82
3-B	20.94	48.20	21.42	56.00	.06	−1.92	54.20	11.76	44.40	1.37
3-C	−37.39	48.80	−51.20	54.12	1.28	−16.71	50.14	−31.89	49.84	1.52
3-D	53.90	60.40	82.84	68.60	2.23	29.14	61.20	56.22	56.20	2.31
3-E	−29.76	74.80	−62.00	93.60	1.93	5.32	87.60	−30.68	87.20	2.12
3-F	−17.40	57.40	−29.60	59.40	1.04	−32.62	65.80	−22.28	58.20	.75
4-A	−250.00	153.00	−312.50	311.00	1.27					
4-B	−119.75	196.00	−248.95	150.75	3.69					
4-C	34.12	136.44	−42.64	117.20	.33					
4-D	32.66	42.40	4.28	46.80	3.19					
4-E	.....	.....	.....	.....	....	26.42	35.59	49.54	19.90	3.55
4-F	.....	.....	.....	.....	....	−5.96	80.80	13.63	56.80	.55
4-G	.....	.....	.....	.....	....	−6.24	45.80	−2.74	37.40	.42
4-H	.....	.....	.....	.....	....	30.71	308.00	34.54	309.00	.06
4-I	.....	.....	.....	.....	....	−63.58	21.70	−64.48	20.90	.21
5-A	87.92	44.80	76.44	74.20	1.14	−40.00	44.40	−54.00	39.60	1.66
6-A	54.95	8.20	55.23	10.40	1.49	54.87	7.96	55.92	9.8	.59
6-B	62.26	9.20	58.21	9.40	2.14	63.80	9.80	61.46	10.75	1.13
6-C	39.01	6.25	37.50	7.15	1.13	38.56	5.95	37.81	6.85	.56

low. There are slight differences in respect to self-sufficiency (3-B), favorable to the Q4 groups. The averages also indicate more introversion (3-C) among the Q1 subjects than the Q4 subjects, but the critical ratios are not high. The test scores show greater dominance for the Q4 groups than for the Q1 groups (3-D). In this instance the ratios are fairly high. There may also be a greater lack of confidence among the Q1 groups than among the Q4 groups. As regards to sociality (3-F) the differences are not consistent from sex to sex, and produce small ratios.

The differences with respect to Artist and Lawyer interests appear to be negligible (4-A) and (4-C), as they are also for the interests of

Teacher in General (4-F), Office Worker (4-G), Social Worker (4-H), and Femininity among women (4-I).

As measured by the Attitude-Interest Analysis Test (5-A), the Q1 men appear to be slightly more masculine than the Q4 men, and the Q1 women somewhat less feminine than the Q4 women. The critical ratios are not high. The remaining critical ratios (6-A, 6-B, and 6-C) are also low. The averages for these indexes show slightly more favorable scores for the Q4 groups than for the Q1 groups with respect to inferiority feelings and general adjustment.

In summary, seven of the thirty-eight ratios reach or exceed 3.00. Although the critical ratios emerging from the other comparisons are below 3.00, the relative magnitudes of the averages in most instances indicate a more favorable score for the good speakers than for the poor speakers.

Tables VII and VIII make possible a comparison of the means of all our subjects on the various tests with those of the published norms, and present the inter-correlations of the tests with indices of speech skill. It appears that in general, the subjects studied do not vary in any marked way from the norms. An exception must be made, of course, for the comparisons with the professional norms for the Strong Tests (Artist, Engineer, etc.). Only in respect to the interest in the teaching of English do the students in the experimental group approach the average score of the professional group.

The first two indices of speech skill on which computations of Table VIII are based have already been discussed. The third, Students' Self-ratings, were based on a nine-step graphic rating scale obtained from a self-rating questionnaire which was filled out by all these students. The last two indices, the Attitude Scale and Experience Inventory Scores, were included to determine relationship of standard psychological test scores to these tests developed in the Speech Field for purposes of studying Speech personality problems.[1]

The inter-correlations of the test scores with the indices of speech skill are generally low, and in many cases negligible and inconsistent from index to index. The tests which show the most consistent tendency to correlate with all indices of speech skill, *i.e.*, Instructor's Ratings, Term Grades, and Self Ratings, are the Speech Experience Inventory, Speech Attitude Scale, The Minnesota Inventory of Social Behavior, and the Social Adjustment scores of The Adjustment

[1] See Knower, Franklin H.: "A Study of Speech Attitudes and Adjustments." *Speech Monographs*, Vol. VI, 1938, pp. 130–203.

TABLE VI.—INDICES OF CENTRAL TENDENCY AND VARIABILITY WITH MEANING OF DIRECTION OF SCORES FOR PSYCHOLOGICAL TESTS

	Experimental subjects				Available norms				Meaning of score direction
	Men		Women		Men		Women		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Williamson and Darley—Social Behavior	141.72	19.70	140.80	18.10	133.67	22.38	131.23	23.46	High Scores = Positive Social Habits
Bell—Adjustment Inventory (Home)	6.94	4.74	7.11	5.12	6.78	5.06	6.20	5.60	High Scores = Negative Home Adj.
Bell—Adjustment Inventory (Health)	6.81	3.80	8.06	4.80	8.29	4.28	7.28	4.62	High Scores = Negative Health Adj.
Bell—Adjustment Inventory (Social)	9.88	5.88	10.82	5.76	10.82	6.64	12.68	7.28	High Scores = Negative Social Adj.
Bell—Adjustment Inventory (Emotional)	7.94	5.33	9.68	6.88	8.60	5.46	10.04	6.44	High Scores = Negative Emot. Adj.
Bernreuter—Pers. Inventory (B1N)	−85.68	76.00	−49.20	92.00	−70.00	.....	−35.00	.....	High Positive Scores = Negative Emot. Adj.
Bernreuter—Pers. Inventory (B2S)	19.62	50.10	2.60	56.40	25.00	.....	5.00	.....	High Positive Scores = Social Independence
Bernreuter—Pers. Inventory (B3I)	−45.32	48.80	−27.20	52.70	−30.00	.....	−15.00	.....	High Positive Scores = Introversion
Bernreuter—Pers. Inventory (B4D)	66.95	65.50	43.20	62.80	45.00	.....	30.00	.....	High Positive Scores = Dominance
Bernreuter—Pers. Inventory (F1C)	−46.00	84.60	21.10	92.00	.....	.....	.....	.....	High Positive Scores = Lack of Confidence
Bernreuter—Pers. Inventory (F2S)	−23.16	48.00	−27.99	60.40	.....	.....	.....	.....	High Positive Scores = Negative Social Adj.
Miles and Terman M-F	70.28	42.50	−52.49	46.30	.....	.....	.....	.....	High Positive Scores = Masculinity
Rundquist and Sletto—Morale	56.10	11.70	55.40	8.62	50.36	11.02	50.29	9.36	High Scores = Low Morale
Rundquist and Sletto—Inferiority	61.30	10.45	61.95	10.30	47.91	10.11	49.86	9.38	High Scores = Sense of Inferiority
Rundquist and Sletto—Adjustment	38.65	7.20	39.60	7.35	53.12	.....	47.55	.....	High Scores = Poor Adjustment
Strong:									
Artist	−355.00	318.00	.....	.....	572.00	.....	.....	.....	High Positive Scores = Interest in Listed Vocations
Engineer	−201.50	127.00	.....	.....	293.00	.....	.....	.....	
Lawyer	−12.10	135.50	.....	.....	288.00				
Masculinity	11.24	89.60	.....	.....	27.00	35.80			
Social Worker	.....	.....	29.32	34.30	.....	.....	91.20	36.80	
Teacher of English	.....	.....	34.25	31.10	.....	.....	43.50	16.05	
Teacher in General	.....	.....	8.43	21.50	.....	.....	76.50	22.60	
Office Women	.....	.....	−1.35	48.80	.....	.....	44.80	59.70	
Masculinity	.....	.....	−59.40	23.40	.....	.....	−43.40	23.00	
Minnesota: College Aptitude Test	56.95	27.70	59.27	27.40	50.00	.....	50.00	.....	High Scores = College Aptitude
Minnesota: College Ability Rating	58.90	21.40	68.86	18.80	50.00	.....	50.00	.....	High Scores = College Ratings Ability
Knower: Speech Attitude Scale	306.40	46.00	291.50	51.00	307.22	43.93	296.10	45.90	High Scores = Positive Attitudes
Knower: Speech Experience Inventory	140.00	28.00	130.83	26.10	127.47	29.65	132.62	29.00	High Scores = Much Experience

TABLE VII.—CORRELATIONS OF PSYCHOLOGICAL TESTS WITH INDICES OF SPEECH SKILL

	Instructor's Ratings		Term Grades		Self-Ratings		Attitude Scale		Experience Inventory	
	M	W	M	W	M	W	M	W	M	W
Williamson and Darley: Social Behavior	.25	.23	.30	.16	.33	.34	.72	.59	.55	.47
Bell: Adjustment Inv. (Home)	.03	.03	−.05	.00	−.05	−.10	.02	−.08	.06	.09
Bell: Adjustment Inv. (Health)	.03	.11	−.12	.14	−.14	.04	.01	.02	.07	.02
Bell: Adjustment Inv. (Social)	−.15	−.05	−.31	−.18	−.42	−.24	−.22	−.68	−.45	−.37
Bell: Adjustment Inv. (Emot.)	.11	−.05	−.09	−.02	−.06	−.03	−.04	−.26	−.07	−.06
Bernreuter: Personality Inv. (BIN)	−.03	−.02	−.15	−.09	−.14	−.06	−.40	−.34	−.32	−.21
Bernreuter: Personality Inv. (B2S)	.07	.06	.14	.09	.17	.19	.15	.39	.08	.24
Bernreuter: Personality Inv. (B3I)	−.02	−.04	−.15	−.04	−.17	−.02	−.14	−.30	−.24	−.20
Bernreuter: Personality Inv. (B4D)	.15	.10	.20	.15	.29	.23	.51	.61	.33	.45
Bernreuter: Personality Inv. (FIC)	−.09	.06	.19	.12	−.18	−.08	−.38	−.42	−.28	−.22
Bernreuter: Personality Inv. (F2S)	−.10	.04	−.04	−.04	−.07	−.07	−.06	.03	−.07	−.09
Miles and Terman: M − F	−.10	−.05	.04	−.10	.26	−.03	.08	.23	.15	.01
Rundquist and Sletto: Morale	−.10	.08	−.04	−.01	−.19	.10	−.04	−.23	−.28	−.11
Rundquist and Sletto: Inferiority	−.14	.10	−.15	−.02	−.14	−.13	−.28	−.19	−.36	−.03
Rundquist and Sletto: Adjustment	−.03	−.13	.19	.01	−.22	−.05	−.11	−.24	−.33	−.16
Strong: Artist	−.06	.....	−.08	.....	.....	.....	−.03	.....	−.17	
Engineer	−.27	.....	−.11	.....	.....	.....	−.13	.....	−.15	
Lawyer	−.09	.....	.02	.....	.....	.....	.02	.....	.01	
Masculinity-Femininity	−.12	.....	−.06	.....	.....	.....	−.02	.....	−.03	
Social Worker	.....	.01	.....	.21	.....	.....	.....	.21	.....	.23
Teacher in General	.....	.19	.....	.14	.....	.....	.....	.18	.....	.11
Teacher of English	.....	.21	.....	.45	.....	.....	.....	.25	.....	.32
Office Worker	.....	−.10	.....	−.06	.....	.....	.....	.00	.....	−.20
Masculinity-Femininity	.....	−.10	.....	−.03	.....	.....	.....	−.07	.....	−.12
Minnesota: College Aptitude Test	.16	.17	.14	.13	.00	.14	.08	.03	.07	.03
Minnesota: College Ability Rating	.07	.13	.17	.15	.04	.17	.10	.04	.09	.04
Intercorrelations of Indices of Speech Skill										
Instructor's Ratings	.....	.....	.61	.56	.26	.31	.34	.27	.28	.38
Term Grades	.....	.....	.....	.....	.26	.40	.32	.28	.23	.34
Self-Ratings	.....	.....	.....	.....	.....	.....	.34	.36	.39	.44
Attitude Scale	.....	.....	.....	.....	.....	.....	.....	.....	.64	.62

Inventory. The correlation signs for the first three Bernreuter scores (B1N, B2S, B3I) are consistent, but the correlations are very low. Term grades and interest in the teaching of English (women) correlate moderately. The correlations signs for the College Aptitude Test and the College Ability Rating are also consistent, but the correlations are very low. The Speech Experience Inventory and the Speech Attitude Scale appear to correlate more highly with student self-ratings than with term grades or instructor's ratings. The same is true of the Minnesota Inventory of Social Behavior, and the Social Adjustment scores of the Adjustment Inventory.

THE ADJUSTMENT INVENTORY

Of the four different scores for the Adjustment Inventory, Social Adjustment is the only one with respect to which good and poor student speakers differ. The comparison of Q1 and Q4 men yielded a critical ratio of 4.30, and the comparison of Q1 and Q4 women yielded a critical ratio of 3.80. The good speakers showed a more favorable social adjustment score than the poor speakers. The average of the six correlations between Social Adjustment and the various indices of speech skill was $-.23 \pm .03$.

An inspection of the item analysis of the test shows about nineteen items which differentiate quite markedly between the responses of the criterion groups. As would be expected from the comparison of the criterion groups on raw scores, the majority of the nineteen items—fifteen—are classified under social adjustment in the test. These items ask the subject such questions as, "Are you sometimes the leader at a social affair?" and "Do you have difficulty in starting conversation with a person to whom you have just been introduced?" The other items fall under the classification of emotional adjustment. "Do you blush easily?" and "Have you ever been afraid you might jump off when you were on a high place?" are examples of this type of item.

Sex differences appear in some of the items. The fear item mentioned differentiates the criterion groups for women but not for men. On the other hand, the social adjustment item, "Do you find it easy to make friendly contacts with members of the opposite sex?," differentiates the criterion groups for men but not for women, or at least not markedly so.

THE MINNESOTA INVENTORY OF SOCIAL BEHAVIOR

Comparisons of the criterion groups for average raw scores on The Minnesota Inventory of Social Behavior show significant critical

ratios for both men and women. The critical ratio for the men was 3.81, and for women 3.14. The good speaker groups show higher average Social Behavior scores than do the poor speaker groups. The average of the six correlations between Social Behavior and the various indices of speech skill was $+27 \pm .03$.

Twenty-four of the forty items of the Minnesota Inventory of Social Behavior differentiate rather markedly between the responses of the good and the poor student speakers for one or both sexes. Sex difference appears in the differentiating power of "Dislikes trying to persuade people to do things." The item appears to be significant for men but not for women, so far as the differentiation of good and poor speakers is concerned. "Gets along as well as the average person in social activities" also differentiates between good and poor men speakers, but not between good and poor women speakers. The same is true to a lesser extent of "Is embarrassed because of lack of experience in social situations." "Enjoys entertaining people" and "Is as well poised as the average person." "Has difficulty talking to most people" shows more differentiation among women speakers than among men speakers.

While twenty-four of the items of this test show rather marked differences between the responses of good and poor student speakers, it should also be noted that on most of the items of the test the good speakers secure a better average score than do the poor speakers. Of the eighty item analyses (men and women) only five show a lower average score for the good speakers than for the poor speakers.

THE PERSONALITY INVENTORY

Comparisons of the criterion groups for average raw scores on the Personality Inventory do not produce critical ratios which reach or exceed 3.00. The highest ratios are for "dominance" scores. The average of the six correlations between dominance and the various indices of speech skill is $+.19 \pm .03$.

About twenty-two of the items of this test show rather marked differentiation between the criterion groups. Over half of these items are social adjustment items similar in character to those found in the Minnesota Inventory of Social Behavior and in the Adjustment Inventory, such as "Do you ever take the lead to enliven a dull party?" Sex differences appear in the items of this test, as in the other tests. For example, "Are you usually considered to be indiffer-

ent to the opposite sex?" shows differentiation in the male criterion group, but not in the female criterion group. Several items, such as "Do you usually prefer to do your own planning alone rather than with others?," suggest a higher degree of independence of attitude among the Q4 students.

VOCATIONAL INTEREST BLANK

Comparisons of the criterion groups for raw scores on the Vocational Interest Blank produced three critical ratios which reach or exceed 3.00. These appear for the Engineering and Masculinity scores among the men, showing the Q1 men to be more like the professional engineer and more masculine than the Q4 men, and for the teaching of English score among the women, showing the Q4 women to be more like the professional teacher of English than are the Q1 women. The average of two correlations of interest in Teaching of English with two indices of speech skill is $+.33 \pm .04$.

The Vocational Interest Blanks have many items containing the names of vocations, activities, school subjects, amusements, and peculiarities of people. The subject is asked to indicate whether he "likes," "is indifferent to," or "dislikes" them. The data of this study indicate a relative tendency for the Q4 students to respond "like" and the Q1 students to respond "dislike." This is consistently true of the men subjects throughout all the mentioned classification of items, *i.e.*, occupations, amusements, etc. Of all the item analyses for the male group, fifty-nine per cent of them show a higher percentage of "like" response for the Q4 group than for the Q1 group. In twenty-nine per cent of the analyses the Q1 students show a higher percentage of "like" responses than do the Q4 response. When the tabulation is carried out in terms of "dislike" responses the reverse is true in about the same proportion, *i.e.*, the Q1 students more frequently show a preponderance of "dislike" responses than do the Q4 students. The same holds true for the women subjects in respect to activities, peculiarities of people, and occupations. About one hundred forty of the items of the Vocational Interest Blanks appear significant, with a somewhat higher proportion for men than for women. It may be that a larger number of items would prove significant with an extension of the number of subjects in the criterion groups, in view of the tendency for the Q4 subjects to respond "like" and the Q1 subjects to respond "dislike."

ATTITUDE-INTEREST ANALYSIS TEST

The critical ratios resulting from the comparison of the criterion groups on raw scores are low. The average masculinity score for the Q4 men is lower than for the Q1 men, and the average femininity score is lower for the Q1 women than for the Q4 women.

Fourteen of the items of this test show rather marked differentiation between the criterion groups of both sexes. They are found chiefly in Exercises IV and V, which have to do with things which arouse basic emotions such as anger, fear, etc., and with vocations, activities, personalities, and books, which the subject may like, dislike, or regard with indifference. Four other items show differentiation in one sex but not the other.

MINNESOTA SCALE FOR THE SURVEY OF OPINIONS

The comparison of the average raw scores of the criterion groups shows little differentiation. Very few of the items in this test yield significant critical ratios.

The student who is interested in a more detailed study of the analysis of test items is referred to the monograph, *Psychological Studies of Individual Differences Among Students of Speech*,[1] in which a complete evaluation of criterion group reactions to test items is reported.

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[1] Gilkinson, Howard and Knower, Franklin H.: *Psychological Studies of Individual Differences Among Students of Speech.* University of Minnesota, Department of Speech, 1939, pp. 197.

INTERESTS OF HIGH-SCHOOL STUDENTS IN MOTION PICTURES AND THE RADIO

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The importance of educating students for a happy and profitable use of their leisure is generally conceded. It has been pointed out repeatedly that technological developments of the past quarter century have greatly increased the amount of leisure time, not only for adults but for youth as well. However, studies reveal that youth is deplorably lacking in resources or inclination to participate in many wholesome pursuits. In fact, expression seems to be progressively curtailed or restricted. Lehman and Witty[9] reported in 1927 that during the ages thirteen to sixteen the range of leisure interests was reduced drastically and limited chiefly to passive or sedentary activities, *i.e.* an almost universal interest in the movies and the radio. Similar trends were disclosed recently by Dimock[12] in a study of two hundred adolescent boys. "The big four (activities) in the passive-spectator category" included: Listening to the radio, going to the movies, riding in an automobile, and watching athletic sports.

These considerations are of unusual significance when one reflects on the amount of time which young people now have available before they obtain their first gainful employment. Several investigators have cited the importance in educational planning of the long interval that elapses between the time when the typical youth leaves school and obtains his first gainful employment. This situation and its consequences are vividly presented in *Youth Tell Their Story*.[8] Studies have repeatedly demonstrated that youth today have more abundant leisure than ever before; however, it seems that few new patterns have appeared during the past ten to fifteen years to replace the dominant pursuits of young people. Accordingly, listening to the radio and attending the cinema still rank high among the favored activities. Their high esteem is revealed by the fact that pupils typically spend more than two hours each day listening to the radio,[1] and attend the movies once or twice a week.[2] Thus, it was found that New York high-school students spent twice as much time listening to the radio as they devoted to recreational reading.[3] Moreover, the quality of the favored radio programs and the preferred photoplays has repeatedly been questioned. For example, Lewin[5] showed that more than half of a group of secondary-school pupils had seen only one of

the ten "best pictures" of the year. Another investigator rated the motion pictures viewed by pupils of Grades VII to XII in the following manner: Twenty-seven per cent were ranked "good"; forty-one per cent, "average"; and thirty per cent, "poor."[6]

That the radio and motion picture have unrealized educational potentialities must, of course, be recognized. And that they will play an increasingly important rôle cannot be doubted. Already, their influence is enormous. Commercial broadcasting is scarcely twenty years old; the first amusement house devoted exclusively to the motion picture was opened in 1902. In 1937, the Columbia Broadcasting System estimated that there were over nineteen million "family hours" of radio listening in the United States, while the weekly world audience at motion picture theaters was estimated at two hundred fifty million in 1939.*

The extent to which the radio and the cinema contribute positively to the educational development of youth depends upon the amount and the character of the guidance and leadership which schools and other agencies are able to provide. To be effective, such guidance must be based upon an understanding of students' present interests in these areas. Some extensive studies are already available which disclose the nature and significance of this undertaking. The study which follows adds, to the already overwhelming evidence, data very recently secured for typical high-school students and also some comparative data for a separate "racial" group.

THE PRESENT STUDY

This study presents a comparison of the interests of white and Negro high-school students in the radio and motion pictures. By means of questionnaires information was obtained from seven hundred one white and nine hundred eighty-six Negro students in two large high schools in the Chicago area. In the two groups there were approximately the same number of students in each of the four high-school grades. The data are presented according to race, sex, and grade level.

INTERESTS IN RADIO PROGRAMS

The almost universal appeal of the radio to high-school pupils is shown by the fact that more than ninety-six per cent of the pupils

* According to *Time magazine*, Vol. XXV, April 8, 1940, p. 48, the estimated "family hours of listening" was 119,238,000 daily in 1940. The increase since 1937 is thus very great.

indicated that they enjoyed listening to the radio. Significant differences were not found in the various grade groups.

Table I shows that radio programs devoted to "stories" constituted the favorite entertainment. Musical programs were second in popularity with Negro boys and girls and with white girls. The white boys gave second preference to variety and comedy programs* which in turn were ranked third by the other groups. These three types of programs proved distinct favorites, while interest in others was meager in comparison. It should be of interest to teachers to observe that only a small percentage of pupils stated that they enjoyed news and educational broadcasts. Similar to other investigations, this study disclosed a considerable interest among the boys in mystery, adventure, gangster, and horror stories, while among the girls, interest in stories of romance predominated.

An analysis of the kinds of music preferred by these high-school pupils showed "swing-music" to be the favorite. This was especially noticeable among the Negro students who in over two-thirds of the cases designated "swing-music" as their first choice. It was also the most popular item in the choices of the white boys. On the other hand, fifty-eight per cent of the white girls gave first place to classical music (symphony, opera, and concert), while only about one-fourth of the other students (the Negro pupils and the white boys) favored classical music. Semiclassic music was liked by fewer students; and other types were seldom mentioned. There were some differences in the choices of the various grade groups. In both schools, classical and semiclassic programs were appreciably more popular in the upper than in the lower grades.

The interests of these adolescent boys and girls were limited largely to the three above mentioned areas—stories, musical, and variety-comedy programs. In fact, the percentage of students who professed an interest in programs containing sports reviews, educational features, news broadcasts, quiz games, and amateur hours was not higher than fifteen in any group. The white boys reported "sports" programs more often than the Negroes, while educational features were named by a somewhat larger proportion of Negro pupils. Variety and comedy programs, however, were cited more frequently by white pupils. Although names of programs were not requested, many students mentioned "Gang Busters" and the "Lux Theater"; and the

* Variety and comedy programs were grouped together because of the great overlapping in these two categories.

TABLE I.—INTERESTS OF WHITE AND NEGRO HIGH-SCHOOL STUDENTS IN RADIO PROGRAMS

Kinds of programs	White high school, percentage of		Negro high school, percentage of	
	Boys	Girls	Boys	Girls
Stories and plays	70.7	71.5	74.3	83.6
Variety and comedy	42.1	46.7	27.9	24.5
Music	39.7	66.4	44.9	41.1
Sports	13.7	1.9	4.9	.7
News	8.9	8.1	15.0	9.0
Educational	4.2	3.3	13.0	12.4
Quiz	4.0	7.3	2.4	4.2
Amateur hours	1.7	3.1	1.7	4.7
Others	3.5	4.3	6.1	9.1
Number of students	335	366	405	581

programs of Jack Benny, Eddie Cantor, Benny Goodman, and Joe Penner appeared frequently. Among the educational offerings, *The University of Chicago Round Table, The Metropolitan Opera* broadcasts, and lectures on science, travel, history, and crime prevention were mentioned, although in all instances by a relatively small number of students.

These results resemble those reported by Tyler,[1] who found that high-school pupils evinced unusual interest in short plays and variety programs. Morgan and Straker[4] reported that Vigo County students cited comedy programs thirty times as frequently as lectures or discussions. In a study of one thousand Chicago school children, DeBoer[10] discovered that stories having dramatic action ranked first in all age groups. Thus, it appears that children and young people are not receiving the maximum benefits which the radio offers for their development; instead, immature interests are too frequently exploited and young people are offered a variety of emotional thrills *via* the air. The school it seems has allowed the radio to be controlled by agencies other than those vitally concerned with the best possible development of children's tastes and attitudes.

INTERESTS IN MOTION PICTURES

The general interest of adolescents in motion pictures was again disclosed by this study. Two-thirds of the white and nearly three-

fourths of the Negro pupils stated that they attended movies at least once a week. Furthermore, thirty-three per cent of the Negro and twenty-nine per cent of the white pupils indicated that they patronized the movies twice a week; and twelve per cent of the Negro and three per cent of the white pupils divulged an average movie attendance of three times each week. Thus frequent movie attendance was exhibited by all students, with somewhat higher frequencies among the Negroes. The girls did not report attendance quite as often as boys; and the seniors attended somewhat less frequently than the freshmen. In these respects this study agrees with the data obtained by Lehman and Witty[9] over a decade ago. They stated then that "over fifty per cent of individuals of ages nine and one-half to twenty-two and one-half reported that they had gone to the cinema at least once during the week preceding each of the several investigations" (p. 228).

To discover what kinds of motion pictures were preferred, the students were asked to check a list of eight types (Table II). Comedy and mystery pictures proved the favorites in all groups, and love stories were very popular among the girls. Western pictures and news reels had stronger appeal for the boys than for the girls; and educational features and news reels were given higher ranks by seniors than by other grade groups.

Certain differences were found in the Negro and white groups. White boys and girls chose comedy pictures as their favorites, giving

TABLE II.—INTERESTS OF WHITE AND NEGRO HIGH-SCHOOL STUDENTS IN MOTION PICTURES

Types of motion pictures	White high school, percentage of		Negro high school, percentage of	
	Boys	Girls	Boys	Girls
Comedy	81.4	81.6	64.1	62.1
Mystery	72.5	62.0	75.3	70.3
Western	57.9	32.7	50.3	38.3
News	53.4	30.3	44.6	24.4
Cartoon	53.1	40.9	43.4	28.9
Gangster	52.2	30.3	66.9	54.2
Educational	45.0	48.6	55.8	48.0
Love	24.1	70.7	27.6	73.1
Number of students	335	366	405	581

them first rank; they were ranked third by the Negroes. Gangster films were far more popular with Negroes than with the white pupils. Educational films, on the other hand, were cited more frequently by the Negro than by the white boys. In most respects, however, the groups reported similar interests. Thus, comedy, mystery, and romance comprised the favorite films of both Negro and white girls. Mystery and comedy pictures were also among the first three choices of both groups of boys. These types of motion pictures are, of course, the kinds our adolescent youth have greatest opportunity to see. Educational movies did not appear to have a strong appeal, although they were given fourth rank by two of the student groups (white girls and Negro boys).

TABLE III.—THE FAVORITE MOVIES OF HIGH-SCHOOL STUDENTS

	Boys' ranks		Girls' ranks	
	White	Negro	White	Negro
Jessie James	1	4	1	4
Dawn Patrol	2			
Tailspin	3			
Gunga Din	4			
Robin Hood	5	2		
Dodge City	6.5			
Heart of the North	6.5			
Angels with Dirty Faces	...	1	..	1
Captain Blood	...	3		
Boys Town	...	5	4	2.5
Marie Antoinette	...	..	2	6
Hardy Family Series	...	..	3	
Sweethearts	...	..	5	
Kentucky	...	..	6	5
Son of Frankenstein	...	6	..	2.5

The pupils were asked to name some of the movies they liked best. The list of titles (Table III), undoubtedly determined primarily by the motion picture offering at the time when the questionnaire was filled out, includes the most frequent choices.

Although several historical films were mentioned by a small percentage of the pupils, gangster, and western films were far more popular. Negro students gave first choice to a film featuring the "Dead End Kids." The girls' list included more pictures in which

the love story was pronounced, or in which there was a musical program. The boys, on the other hand, chose horror films, aviation pictures and "westerns." Negro boys showed unusual interest in gangster films and pictures dealing with criminals. The freshmen showed considerable interest in series pictures, such as the *Hardy Family*, but the other groups did not favor this type of picture.

SUMMARY AND INTERPRETATION

This study, like others,[7] has presented further evidence of the strong appeal of the radio and motion picture as leisure time interests of adolescents. Almost without exception these students indicated that they enjoyed listening to the radio; the majority stated that they attended the movies at least once a week; many of them, two or three times weekly. These recreational activities undoubtedly occupy a considerable portion of the leisure time of high-school pupils.

The need for guidance in these areas of activity is at once apparent. Both on the air and in the theater boys enjoy stories dealing with gangsters, mysteries, and adventures, while girls appear to be preoccupied with the love theme. Although there is some evidence of interest in news and educational features among the more mature students, the percentage showing preference for these types of programs was comparatively small in all grades. In fact, there is no reason to believe that attendance in the high school is associated with a significant alteration in the habits and tastes of students in these areas. Certainly it seems justifiable to expect the school to alter and improve the tastes and attitudes of young people. If the influences which the radio and the cinema bring to bear upon students during out-of-school hours are to be worth while, it is urgent that teachers deal directly with pupils' attitudes toward these experiences.

The preservation of democracy is dependent upon the maintenance of citizens who have learned to distinguish between the valid and the biased interpretation and presentation which are offered through these channels. The influence of the movie and the radio should not be neglected nor minimized, especially in the formation of attitudes and values. As DeBoer[10] states: "Children are definitely less critical, less analytical and more passively receptive when listening to the radio than when they are face to face with the speaker." The classroom, therefore, should be a place where information secured over the radio or from a film is introduced freely by students and analyzed as to its accuracy and implications. If the information it provides is inaccu-

rate or incomplete, or if it is tinged with propaganda, students should be guided to discover its limitations and to think through the reasons for its presentation. The power of the radio and the motion picture in molding public opinion should be discussed, and pupils should be led to understand how their own attitudes on social, economic, and political issues are colored or determined by radio programs and movies.

It is also essential that secondary schools help pupils to discriminate between programs and to recognize and compare their quality. To achieve this end it is necessary that the movie and radio interests of pupils find expression in the classroom. Schools should develop and have recourse to libraries of films and recordings. These can also be very profitably employed in discussions centering around personal and community problems. The use of films as aids in the development of human relations has already been demonstrated by the Commission on Human Relations,* and many short films are now available for group use.

To help pupils to select broadcasts and photoplays intelligently and to evaluate them critically are responsibilities of every teacher. Their usefulness is not limited to any field. On the contrary, they may be employed to vitalize and enrich instruction in every area of the secondary school. Moreover, it is important that instruction in the use of the radio and motion pictures be thought of as a continuous process to be pursued on all levels. The psychological time to guide students' interests in these media of learning and recreation is when opportunities naturally present themselves, rather than at related intervals or by means of set units or courses of instruction.

It seems that the school has failed to realize some of the potentialities of the radio and the motion picture, and has left them to be used and controlled by persons interested in financial returns rather than the well-rounded development of youth. The possibilities of the radio and the movie for the enhancement and improvement of life are indeed great. Their influence may be directed toward the production of desirable attitudes, values and tastes, and their universal appeal makes them particularly valuable as agencies for fostering human relationships and social understanding. As yet, these possibilities have been only partially realized and explored.

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* Of the Progressive Education Association.

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SOME STATISTICAL ASPECTS OF PROFILE RECORDS

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A profile has been variously defined: As a line diagram which indicates the relative position of an individual or group in each of several traits, thus bringing into relief divergent standing on various traits as well as the general tenor of the scores or ratings; as a curve uniting the successive points on a graph representing an individual's status in each of several traits; and as a method of recording the status of an individual in each of several traits so that the geometric pattern so created may be meaningful.

To a great extent the earmarks of good profiles have been a matter of opinion, rather than a matter of statistical or psychological study. Such factors as independence of the variables, scaling of the profile scales, relative importances of the variables, number, and individual differentiation, uniqueness of pattern, and stability of the profile, have been mentioned, but little has been done about them.

It is the purpose of this paper to present certain assumptions relative to the characteristics of profiles, the statistical functions derived from the assumptions, and some practical conclusions which may be drawn from the functions.

In order to make the discussion clearer let us use, as an example, a profile made up of four traits or variables. From such an example generalization to n traits may readily be made. Figure 1 shows a profile made up of four variables. These variables may be test scores, physical measurements, ratings and the like. Each trait is expressed in terms of standard scores. Thus the points z_1, z_2, z_3, and z_4, in Fig. 1 are the standard scores, on an initial testing of a given individual, while the points, $z_{1'}$, $z_{2'}$, $z_{3'}$, $z_{4'}$, are the standard scores for a later observation of these same four traits in the same individual.

I

To be of more importance than passing fancy, a profile must have some stability. It must reflect essentially the same information one day as any other day.

The stability of such a profile as (z_1, z_2, z_3, z_4) may be investigated by comparing each profile, point by point, with the corresponding later

profile ($z_{1'}$, $z_{2'}$, $z_{3'}$ $z_{4'}$). This suggests an index of stability formed by taking the arithmetic mean of the correlations between the corresponding points.

$$\bar{r} = \frac{r_{11'} + r_{22'} + r_{33'} + r_{44'}}{4} \tag{1}$$

Generalized, this becomes

$$\bar{r}_{ii'} = \frac{Sr_{ii'}}{n} \tag{2}$$

where S indicates the summation from 1 to n and n is the number of traits in the profile.

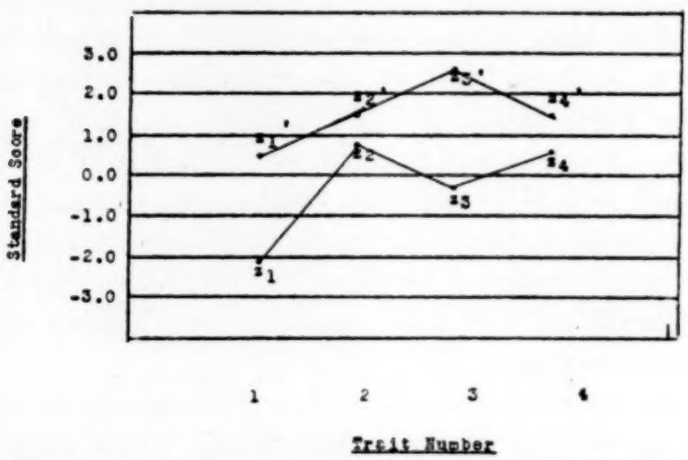

FIG. 1.—Profile of four traits and a later observation of the same four traits, expressed as standard scores.

If the two series of observations were made within a short time of each other, and assuming no real change in the traits observed, such a function is the mean of the retest reliabilities of the several traits.

If, however, the retest reliabilities are assumed to be perfect, then insofar as (2) is less than unity, non-uniform changes in the observations of the several traits are reflected.

This type of function, the mean test-retest coefficient, is severely limited as a device for studying the characteristics of profiles generally, since it does not include any reference to the interrelations of the variables, nor to any outside criterion. It reflects only stability of the several points of the profile and not the stability of the profile pattern.

II

Again, one may investigate the stability of a profile by studying the stability of the differences among the variate values for a given individual. For a four-variable profile, the possible differences are $(z_1 - z_2)$, $(z_1 - z_3)$, $(z_1 - z_4)$, $(z_2 - z_3)$, $(z_2 - z_4)$, and $(z_3 - z_4)$. To obtain an index of stability, assuming that the persistence of such differences is the important characteristic of the profile, one might use the mean of the correlations between the various differences. Such a function, in the case of four variables, might be the mean of the six correlations of the corresponding differences: $(z_1 - z_2)$ with $(z_{1'} - z_{2'})$; $(z_1 - z_3)$ with $(z_{1'} - z_{3'})$; $(z_1 - z_4)$ with $(z_{1'} - z_{4'})$; $(z_2 - z_3)$ with $(z_{2'} - z_{3'})$; $(z_2 - z_4)$ with $(z_{2'} - z_{4'})$; and $(z_3 - z_4)$ with $(z_{3'} - z_{4'})$. The formula for the correlation of such a difference with the corresponding retest difference has been developed by Brolyer.[1] He noted that

$$r_{(z_1-z_2)(z_{1'}-z_{2'})} = \frac{r_{11'} + r_{22'} - r_{12'} - r_{21'}}{2\sqrt{1 - r_{12}}\sqrt{1 - r_{1'2'}}} \tag{3}$$

If the two variables are completely independent,

$$r_{12} = r_{1'2'} = r_{1'2} = r_{12'} = 0,$$

and hence,

$$r_{(z_1-z_2)(z_{1'}-z_{2'})} = \frac{r_{11'} + r_{22'}}{2} \tag{4}$$

This is the same as formula (1) for the case of two variables. The function proposed above would be the mean of all six such correlations between differences as in formula (3), and in the general case, the mean of the $n(n - 1)/2$ such correlations of differences among n variables. Such an average of the $n(n - 1)/2$ correlation functions as in (3), takes into consideration the correlations (r_{12}, $r_{12'}$, $r_{1'2}$ and $r_{1'2'}$) as well as the reliabilities ($r_{11'}$ and $r_{22'}$).

III

It might be more feasible to use an aggregate function in studying profiles rather than an average function such as would be obtained by averaging a series of functions such as (3). To do this, consider each pair of differences an observation, *i.e.*, $(z_1 - z_2)$ and $(z_{1'} - z_{2'})$, as the coördinates of a point in a correlation table. The point $(z_2 - z_4)$,

[1] Brolyer, Cecil R.: *Sixth Annual Report of the Commission on Scholastic Aptitude Tests*, New York City: College Entrance Examination Board, 1931, pp. 19–20.

$(z_{2'} - z_{4'})$ is plotted in the same table. Since there are $n(n-1)/2$ sets of points for each individual and there are N individuals in the sample, a correlation of $Nn(n-1)/2$ pairs of observations is obtained. This index of stability of a profile may be set up for four variables as follows:

$$R = \frac{\begin{array}{l}\Sigma[(z_1 - z_2)(z_{1'} - z_{2'}) + (z_1 - z_3)(z_{1'} - z_{3'}) + (z_1 - z_4)(z_{1'} - z_{4'}) \\ \quad + (z_2 - z_3)(z_{2'} - z_{3'}) + (z_2 - z_4)(z_{2'} - z_{4'}) \\ \quad + (z_3 - z_4)(z_{3'} - z_{4'})]\end{array}}{\sqrt{\begin{array}{l}\Sigma[z_1 - z_2)^2 + (z_1 - z_3)^2 \\ \quad + (z_1 - z_4)^2 + (z_2 - z_3)^2 \\ \quad + (z_2 - z_4)^2 + (z_3 - z_4)^2]\end{array}}\sqrt{\begin{array}{l}\Sigma[(z_{1'} - z_{2'})^2 + (z_{1'} - z_{3'})^2 \\ \quad + (z_{1'} - z_{4'})^2 + (z_{2'} - z_{3'})^2 \\ \quad + (z_{2'} - z_{4'})^2 + (z_{3'} - z_{4'})^2]\end{array}}} \tag{5}$$

The summations are from 1 to N. It may be noted that $\Sigma z_i z_j = Nr_{ij}$, $(i \neq j)$, and that $\Sigma z^2 = N$, so that (5) may be written,

$$R = \frac{\begin{array}{l}3(r_{11'} + r_{22'} + r_{33'} + r_{44'}) - (r_{12'} + r_{13'} + r_{14'} + r_{21'} \\ \quad + r_{23'} + r_{24'} + r_{31'} + r_{32'} + r_{34'} + r_{41'} + r_{42'} + r_{43'})\end{array}}{\sqrt{\begin{array}{l}12 - 2(r_{12} + r_{13} + r_{14} \\ \quad + r_{23} + r_{24} + r_{34})\end{array}}\sqrt{\begin{array}{l}12 - 2(r_{1'2'} + r_{1'3'} + r_{1'4'} \\ \quad + r_{2'3'} + r_{2'4'} + r_{3'4'})\end{array}}} \tag{6}$$

Equation (6) may be stated in a more general form,

$$R = \frac{(n-1)Sr_{ii'} - Sr_{ij'}}{\sqrt{n(n-1) - 2Sr_{ij}}\sqrt{n(n-1) - 2Sr_{i'j'}}} \tag{7}$$

where $i \neq j$ and $i' \neq j'$.

The sums may be defined as follows:

$$Sr_{ii'} = r_{11'} + r_{22'} + r_{33'} + \cdots + r_{nn}$$

and is the sum of the correlations between the initial and later observations of the same traits. It is also the numerator of the formula (2).

$$Sr_{ij'} = r_{12'} + r_{13'} + \cdots + r_{1n'} + r_{21'} + r_{23'} + \cdots + r_{2n'} + \cdots + r_{n(n-1)'}$$

and is the sum of the correlations of each of the initial series of variables with each of the variables of the later series, excluding those of the same number. There are $(n^2 - n)$ such correlation coefficients.

$$Sr_{ij} = r_{12} + r_{13} + r_{14} + \cdots + r_{(n-1)n}$$

and is the sum of the intercorrelations of the variables in the initial profile.

$$Sr_{i'j'} = r_{1'2'} + r_{1'3'} + r_{1'4'} + \cdots + r_{(n-1)'n'}$$

and is the sum of the intercorrelations of the later or retest profile.

These sums may be better comprehended if a table of intercorrelations be constructed for the four variables. Such a table is shown (Table I) for four variables, each one appearing as an initial variable

TABLE I.—TABLE OF INTERCORRELATIONS

	1	2	3	4	1′	2′	3′	4′	
1	...	r_{12}	r_{13}	r_{14}	$(r_{11'})$	$r_{12'}$	$r_{13'}$	$r_{14'}$	
2	r_{21}	...	r_{23}	r_{24}	$r_{21'}$	$(r_{22'})$	$r_{23'}$	$r_{24'}$	
3	r_{31}	r_{32}	...	r_{34}	$r_{31'}$	$r_{32'}$	$(r_{33'})$	$r_{34'}$	
4	r_{41}	r_{42}	r_{43}	...	$r_{41'}$	$r_{42'}$	$r_{43'}$	$(r_{44'})$	
1′	$(r_{1'1})$	$r_{1'2}$	$r_{1'3}$	$r_{1'4}$	...	$r_{1'2'}$	$r_{1'3'}$	$r_{1'4'}$	
2′	$r_{2'1}$	$(r_{2'2})$	$r_{2'3}$	$r_{2'4}$	$r_{2'1'}$	...	$r_{2'3'}$	$r_{2'4'}$	
3′	$r_{3'1}$	$r_{3'2}$	$(r_{3'3})$	$r_{3'4}$	$r_{3'1'}$	$r_{3'2'}$	...	$r_{3'4'}$	
4′	$r_{4'1}$	$r_{4'2}$	$r_{4'3}$	$(r_{4'4})$	$r_{4'1'}$	$r_{4'2'}$	$r_{4'3'}$		

and as a retest variable. In Table I, the major diagonal is left blank. The quantity, $Sr_{ii'}$ is the sum of the diagonal values of either the upper right or lower left quadrants of the table. $2Sr_{ij}$ is the sum of the values in the upper left quadrant of the table. $2Sr_{i'j'}$ is the sum of the values in the lower right quadrant of the table. $Sr_{ij'}$ is the sum of the values, excluding the diagonal, in either the lower left or upper right quadrant of the table.

If both numerator and denominator of (7) are divided by $n(n-1)$, the function becomes

$$R = \frac{\dfrac{Sr_{ii'}}{n} - \dfrac{Sr_{ij'}}{n(n-1)}}{\sqrt{1 - \dfrac{2Sr_{ij}}{n(n-1)}}\sqrt{1 - \dfrac{2Sr_{i'j'}}{n(n-1)}}} \tag{8}$$

It may be noted that

$$\bar{r}_{ii'} = \frac{Sr_{ii'}}{n}, \qquad \bar{r}_{ij'} = \frac{Sr_{ij'}}{n(n-1)}, \qquad \bar{r}_{ij} = \frac{2Sr_{ij}}{n(n-1)},$$

and

$$\bar{r}_{i'j'} = \frac{2Sr_{i'j'}}{n(n-1)}$$

so that R may be written as a function of the average correlations $\bar{r}_{ii'}$, $\bar{r}_{ij'}$, $\bar{r}_{ij}$, and $\bar{r}_{i'j'}$, producing a formula which may be easier to understand.

$$R = \frac{\bar{r}_{ii'} - \bar{r}_{ij'}}{\sqrt{1 - \bar{r}_{ij}}\sqrt{1 - \bar{r}_{i'j'}}} \tag{9}$$

From an examination of formula (9) it appears that if the stability index is to be high, the value of $\bar{r}_{ii'}$ must be high. The variables comprising a profile should have high reliability. Suppose that one had a set of variables each of which was perfectly reliable (*i.e.*, $\bar{r}_{ii'} = 1.00$). Then $\bar{r}_{ij} = \bar{r}_{i'j'} = \bar{r}_{ij'}$. In such a case, formula (9) will become unity, suggesting that when the reliabilities of the selected variables of a profile are extremely high, the intercorrelations of those variables have little to contribute to such an index of stability. If the reliabilities of the several variables are distinctly less than unity, then low intercorrelations of the variables becomes important. If the intercorrelations are unity ($\bar{r}_{ij} = \bar{r}_{i'j'} = r_{ij'} = 1.00$), then $r_{ii'}$ will also be equal to 1.00 and the function (9) is indeterminate.

IV

What is the average magnitude of intercorrelation among the variables, for a given value of $\bar{r}_{ii'}$, to produce a maximum value of R? Suppose that $\bar{r}_{ij'} = \bar{r}_{i'j} = \bar{r}_{i'j'}$. Such an assumption is likely not far from the truth. Then,

$$R = \frac{\bar{r}_{ii'} - \bar{r}_{ij}}{1 - \bar{r}_{ij}} \tag{10}$$

Figure 2 serves well to show the relations expressed by equation (10). In Fig. 2 the ordinate is R, and the abscissa $\bar{r}_{ij}$ (the average intercorrelation). Curves are drawn for selected values of $\bar{r}_{ii'}$ (reliability). The optimal values of $\bar{r}_{ij}$ appear to be close to zero or negative. Schraeder[1] has shown that the minimum average intercorrelation among n variables is $-1/(n-1)$. In the light of this, it is quite proper to conclude that the optimal values of $\bar{r}_{ij}$ (the average correlation among the profile

[1] Schraeder, W. A. B.: *Minimum Average Intercorrelation*, an unpublished manuscript.

variables) are in the neighborhood of zero. It may be observed that as the value of $\bar{r}_{ij}$ approaches $\bar{r}_{ii'}$, the value of R approaches zero. In short, if the intertest correlations approach the reliabilities in value, the profile will be distinctly lacking in stability.

Such a function might indicate the undesirability of placing several measures of the same trait in a profile. Often one finds the scores of two intelligence tests, or two reading tests, in the same profile record. In order to preserve high pattern stability, the scores of two or more measures of the same trait might be averaged and the averaged value treated as a single variable.

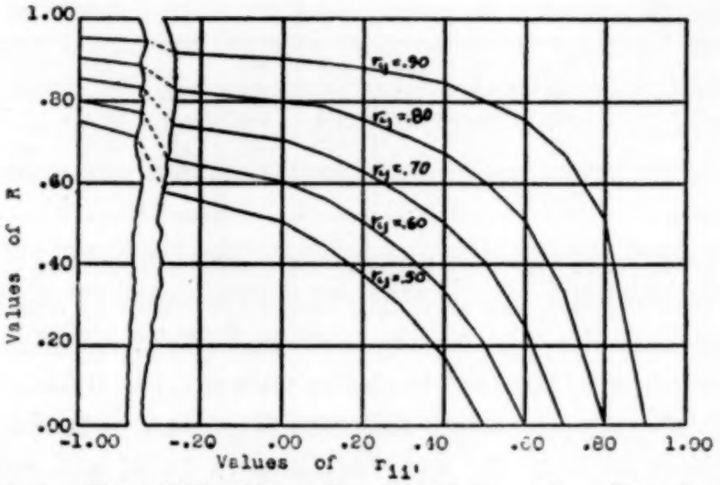

FIG. 2.—The relationship of R and $r_{ii'}$ for specific values of r_{ij}.

V

Better to demonstrate such a stability function, the scores on five tests were obtained for a sample of one hundred sixty-seven Ohio State undergraduates enrolled in a "How to Study" course. These variables are:

Pressey Reading Speed and Comprehension Test:

1. Reading Speed
2. Reading Comprehension score

Pressey General Reading Test

3. Topic Sentence
4. Vocabulary
5. Grammar

These tests were given at the beginning of the course and again toward the end of the course. The intercorrelations of the ten variables (five initial test and five retest) are shown in Table II.

TABLE II.—INTERCORRELATIONS OF INITIAL AND RETEST PROFILE SCORES (N = 167)

	1	2	3	4	5	1′	2′	3′	4′	5′
1. Reading Speed	.....	.105	.391	.489	.314	(.523)	.268	.297	.402	.287
2. Comprehension	.105	.....	.166	.250	.170	.198	(.229)	.186	.289	.166
3. Topic Sentence	.391	.166	.....	.478	.401	.213	.249	(.343)	.343	.355
4. Vocabulary	.489	.250	.478	.....	.492	.334	.312	.329	(.632)	.408
5. Grammar	.314	.170	.401	.492	.....	.172	.337	.416	.435	(.692)
1′. Reading Speed	(.523)	.198	.213	.334	.172	.....	.103	.351	.386	.234
2′. Comprehension	.268	(.229)	.249	.312	.337	.103	.....	.254	.317	.300
3′. Topic Sentence	.297	.186	(.343)	.329	.416	.351	.254	.....	.348	.324
4′. Vocabulary	.402	.289	.343	(.632)	.435	.386	.317	.348	.....	.452
5′. Grammar	.287	.166	.355	.408	(.692)	.234	.300	.324	.452	

For the profiles of the five test-retest variables for the one hundred sixty-seven individuals, the stability index (formula 7) was found to be 0.269. This may be due to the low test-retest coefficients ($\bar{r}_{ii'} = 0.484$), or perhaps to the fact that the values $\bar{r}_{ij} = 0.316$, $\bar{r}_{ij'} = 0.300$ and $\bar{r}_{i'j'} = 0.307$, are not much different from $\bar{r}_{ii'}(= 0.484)$.

If one omits each of the five variables in turn, and computes the stability for each combination of four remaining variables, the five stability indices are: For variables 2, 3, 4 and 5, 0.231; for variables 1, 3, 4 and 5, 0.352; for variables 1, 2, 4 and 5, 0.312; for variables 1, 2, 3 and 5, 0.249; and for variables 1, 2, 3 and 4, 0.211. The four variables giving the most stable profile are 1, 3, 4 and 5. That the low value of $\bar{r}_{ii'}$ may account for the low stability index may be inferred from the inverse relationship of the stability indices to the test-retest coefficients of the omitted variables.

One might go further, computing the stability indices for all combinations of the tests taken three at a time and two at a time, eliminating those variables which offer generous contributions toward lower stabilities.

It must be noted here that low test-retest coefficients for the above sample are no reflection of unreliability, since considerable training was given the one hundred sixty-seven subjects in reading skills between the first and second testings. The amounts and specific kinds of training were varied to meet individual needs.

VI

If one selects the variables solely for their contribution to profile stability, a build-up method may be used. This involves the following steps:

(1) Using formula (3), select those two variables having the highest value of $r_{(z_1-z_2)(z_1'-z_2')}$.

(2) Try the selected variables with each of the remaining variables in turn, using formula (7). The third variable to be put in the profile is that one which when combined with the two already chosen, produces the highest index of stability.

(3) To select a fourth variable compute the stability index for the three chosen variables in combination with each of the remaining variables in turn. The process may be continued until the addition of any one variable to those already chosen fails to raise the stability index, or until the stability index falls lower than some preassigned value.

Job sheet methods can easily be developed for such a procedure. However, almost never would any designer of profiles select his traits or variables solely on such a basis.

VII

Seldom does an investigator have test-retest data from which to compute stability indices for his profiles. In such a case, usable approximations may be obtained. If formula (10) is used, the mean test-retest coefficient and the average of intercorrelations will be involved. The former will have to be estimated. Several methods may be suggested. The split-half method may be used. Kuder and Richardson[1] suggest several formulas based on assumptions regarding inter-item correlation and item difficulty which are applicable under limited circumstances. Estimates of test-retest reliabilities may be made on the basis of other studies. The average of the intercorrelations may be obtained directly from the data at hand, either by computing all the $n(n-1)/2$ correlations or by the method suggested by Edgerton and Toops.[2]

[1] Kuder, G. F., and Richardson, M. W.: "The Theory of the Estimation of Test Reliability." *Psychometrika*, Vol. II, pp. 151–160.

[2] Edgerton, H. A., and Toops, H. A.: "A Formula for Finding the Average Intercorrelation of Unranked Raw Scores Without Solving Any of the Individual Intercorrelations." *Journal of Educational Psychology*, Vol. XIX, Feb., 1928, pp. 131–138.

Such estimates of profile stability are to be considered crude estimates and not accurate indices. In using this method of estimating the stability index of a profile, one will usually obtain values a little lower than the real index. The value of $\bar{r}_{ij}$ is a good estimate of itself and of $\bar{r}_{i'j'}$, but generally will be greater than $\bar{r}_{ij'}$. Hence, in following formula (10) one will obtain a smaller numerator than if he had been able to use formula (9).

VIII

One may wish to set up a weighted profile assigning varying weights or importances to the several variables. This may be considered a problem of scaling.

Suppose that each of the n variables were assigned a weight, w_i. Then w_2, for example, is applied to both z_2 and $z_{2'}$. Such a weight, if less than unity, decreases the scale of profile for that variable, and increases or stretches the scale of the variable if greater than unity. The index of stability of such weighted profiles is

$$R = \frac{(n-1)Sw_iw_jr_{ij'} - Sw_iw_jr_{ij'}}{\sqrt{(n-1)Sw_i^2 - 2Sw_iw_jr_{ij}}\ \sqrt{(n-1)Sw_i^2 - 2Sw_iw_jr_{i'j'}}} \qquad (12)$$

The similarity of (12) to (7) is discernable. The computation of (12) is almost as simple as (7). Table III shows the scheme of such computation for four variables.

(1) Copy the intercorrelations of Table I into Table III, putting 1.00's on the major diagonal.

(2) Multiply each value in each row by the w appropriate to that row, *e.g.*, in row 1 multiply each value by w_1 and record; in row 2 multiply each value by w_2 and record; in row 1′ multiply each value by w_1 and record, etc.

(3) Multiply each second value in each box by the w of the column, recording in the third position in the box.

Then, $Sw_i^2r_{ii'}$ is the sum of the bottom (third) values in all boxes of the major diagonal of either the upper right or lower left quadrant of the table.

$2Sw_iw_jr_{ij}$ is the sum of the bottom values in all boxes of the upper left quadrant, excluding the major diagonal.

$2Sw_iw_jr_{i'j'}$ is the sum of the bottom values in all boxes of the lower right quadrant, excluding the major diagonal.

$2Sw_iw_jw_{ij'}$ is the sum of the bottom values in all boxes of either the upper right or lower left quadrants, excluding the major diagonal.

Sw_i^2 is the sum of the bottom values in all boxes of the major diagonal of either the upper left or lower right quadrants.

Such a series of weights may be assigned by any of several methods. They may be arbitrarily assigned or determined by some statistical procedure. Some of the possibilities are enumerated.

TABLE III.—COMPUTATION OF SUMS FOR SOLVING FORMULA (11)

	(w_1) 1	(w_2) 2	(w_3) 3	(w_4) 4	(w_1) 1′	(w_2) 2′	(w_3) 3′	(w_4) 4′
(w_1) 1	1.00 w_1 w_1^2	r_{12} w_1r_{12} $w_1w_2r_{12}$	r_{13} w_1r_{13} $w_1w_3r_{13}$	r_{14} w_1r_{14} $w_1w_4r_{14}$	r_{11}' w_1r_{11}' $w_1^2r_{11}'$	r_{12}' w_1r_{12}' $w_1w_2r_{12}'$	r_{13}' w_1r_{13}' $w_1w_3r_{13}'$	r_{14}' w_1r_{14}' $w_1w_4r_{14}'$
(w_2) 2	r_{21} w_2r_{21} $w_1w_2r_{21}$	1.00 w_2 w_2^2	r_{23} w_2r_{23} $w_2w_3r_{23}$	r_{24} w_2r_{24} $w_2w_4r_{24}$	r_{21}' w_2r_{21}' $w_2w_1r_{21}'$	r_{22}' w_2r_{22}' w_2r_{22}'	r_{23}' w_2r_{23}' $w_2w_3r_{23}'$	r_{24}' w_2r_{24}' $w_2w_4r_{24}'$
(w_3) 3	r_{31} w_3r_{31} $w_1w_3r_{31}$	r_{32} w_3r_{32} $w_2w_3r_{32}$	1.00 w_3 w_3^2	r_{34} w_3r_{34} $w_3w_4r_{34}$	r_{31}' w_3r_{31}' $w_3w_1r_{31}'$	r_{32}' w_3r_{32}' $w_3w_2r_{32}'$	r_{33}' w_3r_{33}' $w_3^2r_{33}'$	r_{34}' w_3r_{34}' $w_3w_4r_{34}'$
(w_4) 4	r_{41} w_4r_{41} $w_1w_4r_{41}$	r_{42} w_4r_{42} $w_2w_4r_{42}$	r_{43} w_4r_{43} $w_4w_3r_{43}$	1.00 w_4 w_4^2	r_{41}' w_4r_{41}' $w_1w_4r_{41}'$	r_{42}' w_4r_{42}' $w_2w_4r_{42}'$	r_{43}' w_4r_{43}' $w_3w_4r_{43}'$	r_{44}' w_4r_{44}' $w_4^2r_{44}'$
(w_1) 1′	$r_1'_1$ $w_1r_1'_1$ $w_1^2r_1'_1$	$r_1'_2$ $w_1r_1'_2$ $w_1w_2r_1'_2$	$r_1'_3$ $w_1r_1'_3$ $w_1w_3r_1'_3$	$r_1'_4$ $w_1r_1'_4$ $w_1w_4r_1'_4$	1.00 w_1 w_1^2	$r_1'_2$ $w_1r_1'_2'$ $w_1w_2r_1'_2'$	$r_1'_3'$ $w_1r_1'_3'$ $w_1w_3r_1'_3'$	$r_1'_4'$ $w_1r_1'_4'$ $w_1w_4r_1'_4'$
(w_2) 2′	$r_2'_1$ $w_2r_2'_1$ $w_1w_2r_2'_1$	$r_2'_2$ $w_2r_2'_2$ $w_2^2r_2'_2$	$r_2'_3$ $w_2r_2'_3$ $w_2w_3r_2'_3$	$r_2'_4$ $w_2r_2'_4$ $w_2w_4r_2'_4$	$r_2'_1'$ $w_2r_2'_1'$ $w_1w_2r_2'_1'$	1.00 w_2 w_2^2	$r_2'_3'$ $w_2r_2'_3'$ $w_2w_3r_2'_3'$	$r_2'_4'$ $w_2r_2'_4'$ $w_2w_4r_2'_4'$
(w_3) 3′	$r_3'_1$ $w_3r_3'_1$ $w_1w_3r_3'_1$	$r_3'_2$ $w_3r_3'_2$ $w_2w_3r_3'_2$	$r_3'_3$ $w_3r_3'_3$ $w_3^2r_3'_3$	$r_3'_4$ $w_3r_3'_4$ $w_4w_3r_3'_4$	$r_3'_1'$ $w_3r_3'_1'$ $w_1w_3r_3'_1'$	$r_3'_2'$ $w_3r_3'_2'$ $w_3w_2r_3'_2'$	1.00 w_3 w_3^2	$r_3'_4'$ $w_3r_3'_4'$ $w_3w_4r_3'_4'$
(w_4) 4′	$r_4'_1$ $w_4r_4'_1$ $w_1w_4r_4'_1$	$r_4'_2$ $w_4r_4'_2$ $w_2w_4r_4'_2$	$r_4'_3$ $w_4r_4'_3$ $w_3w_4r_4'_3$	$r_4'_4$ $w_4r_4'_4$ $w_4^2r_4'_4$	$r_4'_1'$ $w_4r_4'_1'$ $w_1w_4r_4'_1'$	$r_4'_2'$ $w_4r_4'_2'$ $w_2w_4r_4'_2'$	$r_4'_3'$ $w_4r_4'_3'$ $w_3w_4r_4'_3'$	1.00 w_4 w_4^2

The weights to be used may be:

(1) Proportional to the judged importances of the variables.

(2) Proportional to the reliability coefficient or reliability index of each variable.

(3) Proportional to the average of the correlations of the given variable with all of the other variables. This emphasizes the common information of the variables, rather than their uniqueness.

(4) Proportional to the partial regression coefficients of the variables with respect to a given criterion. In this case the general level of the profile becomes important, since such weighted values, when summed, are an estimate of the criterion.

(5) Proportional to the weights assigned by some statistical procedure such as the method of minimum variation.[1]

In each of the above cases, the characteristics of the profile which have significance will differ. Such significances, however, cannot be completely independent of profile stability.

SUMMARY

This study is an attempt to find statistically where some of the opinions regarding profile graphs may lead. If it is assumed that the differences among the several variates in a profile should be stable, it is shown that high reliabilities and low intercorrelations of the variables are demanded. A stability function was developed which may prove useful in investigations involving profile records. Several methods of weighting the variables of a profile are noted. Computational procedures for estimating the stability of such weighted profiles are given.

[1] Edgerton, H. A., and Kolbe, Laverne: "The Method of Minimum Variation for the Combination of Criteria." *Psychometrika*, Vol. 1, pp. 183–187.

A FACTORIAL ANALYSIS OF INTERESTS AND VALUES

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INTRODUCTION

Allport and Vernon[1] following Spranger's classification in *Types of Men*[7] have constructed a test to determine the relative prominence of six basic motives or evaluative attitudes by which men govern themselves. These are theoretical, economic, esthetic, political, social and religious. Spranger states that on empirical test these values may not be found, for they are ideals which may only be approximated. He does affirm, however, that human behavior is to be understood in terms of these ideal concepts.

E. K. Strong, Jr., starting with the practical purpose of differentiating men engaged in different occupations, has developed the Vocational Interest Test.[10] Strong had no preconceived notions concerning the number of types into which interests could be classified; he merely asserted that occupational groups could be distinguished from one another. His success in achieving this goal has long been recognized.

We have what might be termed an empirical approach, exemplified by the work of Strong, and a theoretical approach, exemplified by that of Allport and Vernon, to the problem of the classification of the interests of man. Examination of the available literature reveals interesting parallels between the results achieved by these two types of approach. Strong has been able to differentiate successfully over thirty occupational groups for men and over twenty for women. Thurstone[11] and Strong[9] have shown in addition that the men's occupational scales may be considered as a function of four (Thurstone) or five (Strong) general (orthogonal) factors.

Stone[8] has found that, although the Allport-Vernon scale is not very accurate in individual diagnosis, various groups of students tend to get differentiating scores. Students interested in medicine, for example, obtain significantly high theoretical scores; students inter-

ested in business and banking get significantly high economic scores, at the same time securing significantly low religious scores; law stuents obtain high political scores; and high esthetic scores are secured by students interested in literature. In no case do groups other than those mentioned make higher scores on those scales.

Allport and Vernon[2] have obtained results comparable to those of Stone. Missionaries get the highest religious scores, and student groups in literature, law, commerce, engineering and science obtain the expected scores. Boy Scout Masters, although scoring highest on the social scale, get neither significantly high nor low scores in any of the scales.

Both the Vocational Interest Test and the Study of Values yield comparable results with respect to sex differences. Vernon and Allport[13] report that males secure higher scores on the theoretic, economic, and political scales, while women secure higher scores on the esthetic, social, and religious scales. Carter and Strong[3] have found (using the Vocational Interest Test) that men prefer scientific, athletic, legal, political and selling activities; while women prefer musical, artistic, literary, social and religious activities.

It would seem, in view of the similarity of results, that the Allport-Vernon Study of Values and the Strong Vocational Interest Test are probing in the same general area of personality. Further tests of their comparability, however, are certainly desirable. In an attempt to provide one such test the writers administered both inventories to ninety-three male Stanford University students. All six of the Allport-Vernon scales were scored, but the Vocational Interest Test was scored only upon eight representative scales: Teacher, office worker, life insurance salesman, certified public accountant, physician, lawyer, Y. M. C. A. secretary, and chemist. All the intercorrelations were computed and the resulting matrix was factor-analyzed by the centroid method. It is this analysis which is the main concern of this paper.

RESULTS AND DISCUSSION

The intercorrelations are presented in Table I. These correlations exhibit certain discrepancies from the results of other experimenters. Two examples are the relationships between (1) the political and theoretical scales, and (2) the economic and political scales. Pintner[6] reports correlations of $-.07$ and $.53$ for these two relationships, while the writers obtain correlations of $-.57$ and $.16$, respectively. Pintner

had only fifty-three cases of whom thirty-three were women. Both factors may have operated to produce the differences.

Duffy and Crissy[4] report correlations of the Allport-Vernon scales with certain of the Strong interest scores. They find a positive relationship between the law and economic scales and a negative relationship between the law and religious scales, while our results are in both cases just the reverse. Again, a sex difference is a possible cause of disagreement, since Duffy and Crissy's results are for women.

Results of the centroid analysis of the correlations in Table I are shown in Table II. At least five significant factors are indicated.

TABLE I.—INTERCORRELATIONS AMONG THE SCORES OF THE STUDY OF VALUES AND SELECTED SCALES FROM THE VOCATIONAL INTEREST TEST

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Theoretic														
2. Economic	−.34													
3. Esthetic	.13	−.26												
4. Social	−.05	−.29	−.28											
5. Political	−.57	.16	−.17	−.26										
6. Religious	−.28	−.46	−.44	.22	−.20									
7. Teacher	.24	−.31	.07	.15	−.41	.24								
8. Life insurance salesman	−.60	.18	−.27	.08	.35	.24	−.23							
9. Certified public accountant	−.05	.04	.07	.13	−.14	.07	.32	.26						
10. Office-worker	−.39	.51	−.30	−.08	.19	−.04	.16	.20	.32					
11. Physician	.59	−.49	.18	.09	−.32	.02	.08	−.60	−.30	−.66				
12. Lawyer	.01	−.43	.12	.10	−.03	.29	.03	.36	.28	−.53	.18			
13. Y. M. C. A. sec't	−.27	.01	−.14	.16	−.03	.21	.65	.36	.36	.57	−.57	−.09		
14. Chemist	.64	−.20	.14	−.04	−.36	−.17	.18	−.90	−.27	−.28	.73	−.35	−.44	

The phi-coefficients are .80, .84, .78, .86 and .82 for the five factors, respectively. Since the limiting value is .93, it would seem that no extraneous factors have been included. Further, the standard deviation of the fifth factor residuals is .07 (that of the fourth factor residuals being .09) so that the postulation of a sixth factor is apparently inadvisable.

Having concluded that five orthogonal variables are sufficient to account for the observed intercorrelations, the next problem is the rotation of the axes to meaningful positions. Each of the senior authors (LWF and LGH) undertook this task independently. After each had to his own satisfaction rotated the axes to the most meaningful (orthogonal) positions, the two sets of results were compared and found to agree almost perfectly. Only minor changes in one rotation

were necessary. The final results are to be found in Table II and in Fig. 1.

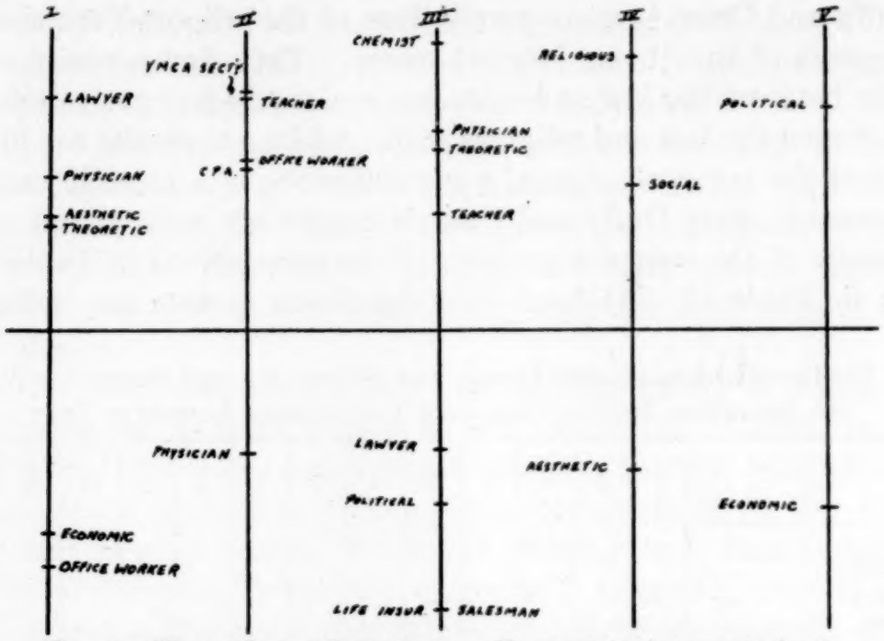

FIG. 1.—The orthogonal continua. (See text for interpretation.)

TABLE II.—RESULTS OF THE CENTROID ANALYSIS OF THE CORRELATIONS PRESENTED IN TABLE I

	Original factor loadings					Rotated factor loadings					
	I	II	III	IV	V	I	II	III	IV	V	h^2
1. Theoretic	.630	.190	.164	.129	.159	.354	−.052	.590	−.132	−.098	.50
2. Economic	.668	−.348	−.232	.315	−.449	−.672	−.110	−.238	−.215	−.596	.92
3. Esthetic	.213	.146	−.232	.456	.207	.381	.052	.044	−.469	.041	.37
4. Social	.108	−.398	.101	−.208	−.118	.097	.097	−.008	.468	.000	.24
5. Political	.547	−.148	.614	−.135	.637	−.264	−.199	−.581	−.183	.720	1.00
6. Religious	.143	−.725	.059	−.401	−.398	.142	.105	−.105	.889	.191	.87
7. Teacher	.246	−.407	.581	.465	−.089	.173	.765	.377	.169	−.052	.79
8. Life insurance salesman	.662	.576	.395	.171	−.086	−.057	.099	−.929	.277	−.093	.96
9. Certified public accountant	.149	.377	−.178	−.334	−.236	.132	.530	−.163	−.022	−.191	.36
10. Office-worker	.762	−.019	−.572	−.129	.150	−.784	.555	−.153	−.036	−.036	.95
11. Physician	.890	.228	−.092	−.086	−.070	.508	−.402	.653	.036	.135	.86
12. Lawyer	.259	−.580	−.544	.116	.268	.772	.017	−.404	.148	−.065	.78
13. Y. M. C. A. sec.	.389	.550	−.425	−.321	.153	−.184	.791	−.204	.237	−.060	.76
14. Chemist	.713	.567	.373	.000	−.118	.047	−.226	.947	−.153	.077	.98
		.009	.012	.038	.010						

Factor I is described by the occupational interest scales for lawyer (.77), physician (.51), and office-worker (−.78), and by the Allport-

Vernon scales for esthetic (.38), theoretic (.35), and economic (−.67). The occurrence of significant loadings on this factor for the theoretic and esthetic scales may occasion some surprise because logically they seem to go better with certain other groupings. A profile analysis,[12] however, although somewhat complex and subjective, shows this grouping to be consistent with the pattern of original correlations.

Factor II is described by the occupational interest scales for teacher (.76), Y. M. C. A. secretary (.79), C. P. A. (.53), office-worker (.56), and physician (−.40). It appears to correspond somewhat to Thurstone's factor "interest in people," but is, perhaps, more nearly like Strong's *B* factor. Duffy and Crissy[4] report a factor which they call by the same name but as they define it only by the social scale it seems more reasonable to identify their factor "interest in people" with our Factor IV.

Factor III is described by the interest scales for chemist (.95), physician (.65), teacher (.38), lawyer (−.40), and life insurance salesman (−.93), and by the theoretic (.59) and political (−.58) values scales. This factor seems similar to Thurstone's "science" factor, isolated also by Lurie[5] and by Duffy and Crissy.[4] The occurrence of significant loadings for the teacher and lawyer scales on this factor may be questioned for a profile analysis[12] indicates that such may not be entirely consistent with the original pattern of correlations. Thus, in any interpretation of this factor it may be more reasonable to disregard these two scales.

Factors IV and V are described entirely in terms of the Allport-Vernon scales: The former by the religious (.89), social (.47) and esthetic (−.47) scales; the latter by the political (.72) and economic (−.60) scales. Although in the last case the signs for the economic and political values are opposed, a profile analysis[12] indicates that they are in many respects similar. Lurie,[5] and Duffy and Crissy,[4] have stressed this similarity. Either a stable factor has not been found, or the present analysis has uncovered a difference between these two interests which previous quantitative studies have missed.

It cannot be argued from the above that the Allport-Vernon Study of Values contains factors which the Vocational Interest Test does not, for all of the scales from the latter test have not been included. Since Factor II, on the other hand, is described entirely in terms of Strong scales, it can be asserted that the Vocational Interest Test measures at least one factor that the Study of Values does not.

In spite of certain disagreements, the comparability of the present results with those of Thurstone,[10] Strong,[8] Lurie,[5] and Duffy and Crissy[4] indicates that fairly stable factors are being isolated. The differences between the studies very possibly may be due to changes in centroid procedures and other techniques between the earlier analyses and the present one. In order to identify more adequately and to name more appropriately the factors involved, further work including other Strong occupational interest scales, interest maturity, femininity-masculinity, intelligence, various attitude and personality schedules, and knowledge of the background of the subjects is necessary.

It is interesting to review the findings with respect to the light they throw on Spranger's theories. Spranger[7] states that the economic man is the practical man and is interested in obtaining wealth, while the political man is interested in obtaining power over people. The lack of unity of these aims is shown in Factor V.

It is also said by Spranger that sometimes the social interest tends to approach the religious attitude. Factor IV demonstrates this similarity. In opposition is found the esthetic person who tends toward egoism and individualism.

Factor I provides another interesting example in support of Spranger's theories. He states that the dominant interest of the theoretical man is the discovery of truth. He is empirical, critical and rational, quite opposed to the economic man who regards unapplied knowledge as waste. It is not surprising, in addition, to find esthetic interests allied with theoretical and opposed to economic on this factor. One would logically have assumed, however, that these scales would be found with the Strong "science" scales in Factor III. In the latter factor theoretical is opposed to political.

Spranger's value types are represented on only four factors. In this sense the Spranger types, as measured by the Allport-Vernon test, are reduced to four. Factor I may be called economic (reverse of "interest in language") to which theoretical and esthetic values are somewhat opposed. Factor IV is largely religious, closely allied to social, but opposed to esthetic. Factor V is heavily weighted both in political and in economic values. Only religious and social values lie on a single factor. The remaining four are more complex, having as they do significant weights on, at least, two factors. Empirical check, while agreeing remarkably well with the logical approaches of Spranger, and Allport and Vernon, yields some rather unsuspected

and surprising relationships in pointing the way toward tests of a more comprehensive nature.

SUMMARY

In an experiment designed to test the comparability of Strong's Vocational Interest Test and Allport-Vernon's Study of Values, both inventories were administered to ninety-three male undergraduates. The former test was scored upon eight representative occupations: Teacher, office-worker, life insurance salesman, certified public accountant, physician, lawyer, Y. M. C. A. secretary, and chemist. Scores on all the Allport-Vernon scales were ascertained. All possible intercorrelations were computed and the resulting matrix factor analyzed by Thurstone's centroid method. This analysis indicates that interests of men, as measured by the Strong and Allport-Vernon tests, may be classified into five orthogonal types. These are as follows:

Type I.—One end of the continuum is defined by scales for lawyer (*S*), physician (*S*), esthetic (*AV*), and theoretical (*AV*); the other end by scales for economic (*AV*) and office-worker (*S*).

Type II.—This factor is described on one end by scales for teacher (*S*), Y. M. C. A. secretary (*S*), certified public accountant (*S*), and on the other end by the scale for physician (*S*).

Type III.—Scales for chemist (*S*), physician (*S*), teacher (*S*), and theoretical (*AV*) define one end, and scales for lawyer (*S*), political (*AV*), and life insurance salesman (*S*) describe the other end of this continuum.

Type IV.—Religious (*AV*) and social (*AV*) scales define one end, and the esthetic (*AV*) describes the other end of this factor.

Type V.—The political (*AV*) and economic (*AV*) scales define the ends of this continuum.

Three of the above factors; namely, Types I, II and III correspond in certain respects to those previously found by Thurstone and termed by him "interest in: (1) Language, (2) people, and (3) science."

Spranger's classification (as measured by the Allport-Vernon test) is to some extent verified empirically, but certain modifications seem desirable. The six Allport-Vernon scales are found on only four factors. The six Spranger types, therefore, are reduced to four. Of the six scales only two, the social and religious, are found on a single factor. They are, in addition, on the same factor and probably should be combined. The other four scales are more complex, having significant

loadings on at least two factors. At least one interest type (*i.e.*, II) measured by the Strong test alone, is not included in the Spranger classification.

Tests for any one of the preceding five factors should be more significant in the analysis of behavior than any one of the Strong or Allport-Vernon scales by itself. The factors will become more meaningful, however, when analyzed in terms of the characteristics of those individuals scoring at opposite ends of the orthogonal continuua.

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TRANSFER OF TRAINING IN LEARNING TO HIT A SUBMERGED TARGET

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The present study was undertaken to afford a general check upon the early study of transfer of training by Scholckow and Judd.[1] In that experiment, fifth- and sixth-grade boys threw darts at a target placed at different depths under water. The results have been widely quoted as important to the theory of transfer of training by generalization.

The intent has been to attack the same problem, and in a fashion essentially similar, but no claim is made that the experimental conditions duplicate those of the earlier study. Available accounts of this study, including the original report published by Judd in 1908, are not adequate to permit a perfect duplication, or to afford a detailed comparison of results. Furthermore, certain variations in the procedure have been purposely introduced to secure a wider variety of evidence on the problem.

INVESTIGATION BY SCHOLCKOW AND JUDD

The study described by Judd was intended to show the relation between knowledge of a principle and practical behavior in a situation to which the principle applies. The subjects were two groups of boys, of fifth- and six-grade school status, equated on the basis of teachers judgments as to their brightness. The boys were required to throw a small dart at a target placed under water. Judd's account of procedure and results follows:

> In this experiment one group of boys was given a full theoretical explanation of refraction. The other group of boys was left to work out experience without theoretical training. These two groups began practise with the target under twelve inches of water. It is a very striking fact that in the first series of trials the boys who knew the theory of refraction and those who did not, gave about the same results. That is, theory seemed to be of no value in the

[1] Judd, C. H.: "The Relation of Special Training to General Intelligence." *Educational Review*, Vol. XXXVI, 1908, pp. 28–42.

first tests. All the boys had to learn how to use the dart, and theory proved to be no substitute for practise. At this point the conditions were changed. The twelve inches of water were reduced to four. The difference between the two groups of boys now came out very strikingly. The boys without theory were very much confused. The practise gained with twelve inches of water did not help them with four inches. Their errors were large and persistent. On the other hand, the boys who had the theory, fitted themselves to four inches very rapidly. Their theory evidently helped them to see the reason why they must not apply the twelve-inch habit to four inches of water.[1]

The number of subjects, details as to the apparatus, the verbal instructions given the tutored group, and the quantitative results were not reported.

PRELIMINARY INVESTIGATION OF TECHNIQUES

In an effort to duplicate as nearly as possible the work of Judd and Scholckow, attempts were made to throw a feathered dart at a target under water. The dart used was of hardwood with a steel point, the feathers being waterproofed with collodion. A bath tub served as tank. Certain difficulties were at once apparent. (1) A strong tendency was found for the dart to ricochet from the surface of the water. (2) Successful penetration of the water and subsequent removal of the dart disturbed the surface of the water so greatly as to require considerable time between throws. (3) The dart itself proved difficult to control as to direction. There was no certainty that the dart would travel in the direction desired.

In view of these difficulties, comparative evidence was secured for dart-throwing and a function believed to be similar; namely, shooting an air gun. Thirty-four boys, selected from those serving as subjects in the later experiment, made a total of thirty-four hundred dart-throws towards a circular target of seven inches diameter at a range of eight feet. Fifteen hundred and twenty throws missed the target. On the other hand, only four air gun shots out of four hundred twenty, made by forty-two of the subjects, missed a circular target of 3.4 inches diameter at a range of fifteen feet. It was further found that the shot penetrated the surface of the water easily and disturbed the surface but slightly. The use of feathered darts was accordingly abandoned as impracticable. It was concluded that the air gun would serve adequately the chief purposes of this study.

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[1] *Ibid.*, p. 37.

DESCRIPTION OF EXPERIMENT

Ninety boys in the eighth grade of a suburban junior high school served as subjects in the experiment. Each was assigned to one of three groups of equal size, designated as: Control group, Experimental group *A*, and Experimental group *B*. Table I shows the mean age of each group to be about fourteen years, and the mean percentile rank for intelligence as measured by the Otis Group Intelligence Scale, to be about seventy. Marksmanship was not tested for all subjects in advance of the experiment, but the preliminary experimentation had shown only negligible differences in this regard between two groups of twenty-one boys each, closely matched in age and intelligence (mean distance from center of target, for one group, at a range of fifteen feet, was .65 inch; for the second group, .59 inch).

TABLE I.—MEAN, CHRONOLOGICAL AGES AND PERCENTILE RANKS OF SUBJECTS

Group	*N*	CA	PR
Control	30	14-0	72.0
Experimental group *A*	30	14-0	70.7
Experimental group *B*	30	14-2	71.8

The air gun (unrifled) was a fifty-shot repeater, firing copper-plated steel BB shot with sufficient force to penetrate the depths of water used and still retain enough velocity to perforate a cardboard target. Standard rifle targets were used, held in a horizontal position in a galvanized iron mounting. The tank was a twenty-gallon tub of galvanized iron, with a bottom diameter of twenty inches, a top diameter of twenty-four inches, and a depth of eleven inches. The subjects fired from a platform eighteen inches high, at a distance of eight feet from the center of the target. The elevated position of the marksman assured that the tank would not obscure part of the target. The subjects used the door frame of the laboratory as a rest while shooting. The experimenter recorded each hit as it was made.

All of the work was done outside of school hours. The subjects participated with enthusiasm in what they regarded as a uniquely desirable activity. Each boy was warned not to give any other boy any clue as to how to hit the bull's-eye. The strong flavor of competition is believed to have been adequate to prevent direct instruction of one subject by another. Three or four boys served as subjects during one period, but each one worked in private.

On the basis of the preliminary work, shots falling in the bull's eye or the ring next to it in the rifle target were regarded as successful. This allowance was found sufficient to guarantee that at the close range used success would be attained as soon as the subject knew where to aim. The mean distance from the center of the target for four hundred twenty shots (ten shots each by forty-two boys) fired at a range of fifteen feet was .62 inch, with a mean deviation of .31 inch. At eight feet the mean error might be expected to become .33 inch, and the mean deviation .17 inch. The "zone of success," on the other hand, was bounded by a circle with a radius of .69 inch.

At the same time, the amount of refraction at the depths employed (six inches and two inches) was great enough so that a boy who aimed at the bull's-eye where it appeared to be was practically certain to miss it by a sizeable margin. For a boy of average height (sixty inches), the position from which he viewed the target was such that the angle of incidence for his line of vision and the surface of the water was fifty-one degrees. At this angle the apparent displacement of the target was 3.11 inches when the water was six inches deep, and 1.04 inches, when the water was two inches deep.

PROCEDURE FOR CONTROL GROUP

As each of the thirty boys constituting the Control group entered the laboratory, he was shown where to stand and told that a record was to be kept of the number of trials necessary before he made three consecutive hits in either the bull's-eye or the ring next to it. The first of these three successful hits was recorded as the one at which mastery of the problem was reached. Two problems were set for each subject, the first with the water at the depth of six inches, the second with the depth of the water changed to two inches. The subjects were required to satisfy the criterion of three consecutive successful hits for the first problem before undertaking the second.

PROCEDURE FOR EXPERIMENTAL GROUPS

For each of the experimental groups, conditions and requirements for the control group were duplicated, with one addition. This was the provision of an elementary explanation of the theory of refraction, which each subject was permitted to study until he declared that he understood it. He was not, however, allowed to ask questions. For group *B* the explanation was identical with that for group *A*, except that one sentence was added. This sentence specifically called atten-

tion to the fact that changing the depth of water changed the amount of the refraction. Following is the complete explanation, which was accompanied by Figure 1:

EXPLANATION OF REFRACTION, AS PROVIDED FOR GROUP A

Everything we see is visible because light comes from it to our eye. Objects under water, when seen from above, do not appear in their true positions. Thus, in the diagram, the rock at *A* seems to be at *B*.

This deception is caused by the refraction, or bending, of the light beam *ACD* at the surface of the water. The light rays are bent because light moves

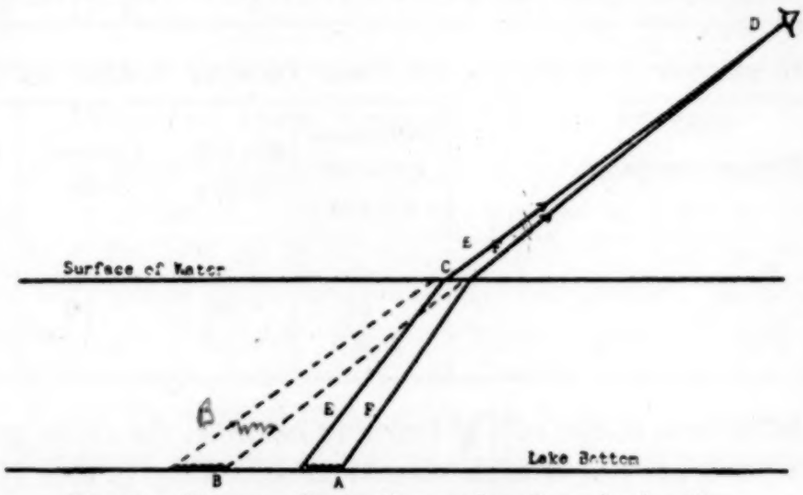

FIG. 1.—Diagram illustrating explanation of refraction.

faster in air than it does in water. The side of the beam marked *E* escapes from the water before the side marked *F* reaches the air. Therefore, side *E* gets ahead of side *F* and the ray of light is actually bent.

We are not used to light rays being bent. Consequently, we suppose that the stone lies in a straight line from our eye, and we make the mistake of thinking that it is at point *B*.

Added Explanation for Group B.—It is easy to see from the diagram that the deeper the lake is, the farther the real rock *A* will be from the image rock *B*.

RESULTS FOR FIRST PROBLEM

Tables II and III present the major results for the first problem, that of learning to hit the target at a depth of six inches. Both experimental groups learned more rapidly than the control group, and group *B* learned more rapidly than group *A*. It will be recalled that Judd reported that in the first trials the boys who knew the theory and those who did not "gave about the same results." In the present study, not

only did theory seem to be of value in the first trials, but the addition of a few words to the explanation measurably increased the apparent value of the theoretical information.

TABLE II.—TRIALS REQUIRED FOR MASTERY OF FIRST PROBLEM (DEPTH SIX INCHES)

Group	Mean	SD
Control	9.10	5.23
Experimental group *A*	8.50	4.08
Experimental group *B*	7.73	3.51

TABLE III.—GROUP DIFFERENCES FOR FIRST PROBLEM (DEPTH SIX INCHES)

Groups compared	Difference between groups	SD difference	Critical ratio	Chances in 1000
Control − *A*	.60	1.21	.49	688
A − *B*	.77	.98	.79	785
Control − *B*	1.37	1.15	1.19	883

The differences in the rate of learning between the three groups on these first trials are not of high statistical reliability (Table III), perhaps because the groups were small. The differences for the two experimental groups are, however, in the same direction.

RESULTS FOR SECOND PROBLEM

Precisely parallel differences are found in the data of Tables IV and V, for the second problem, that of learning to hit the target at a depth of two inches. Here the differences are in keeping with the differences reported by Judd, although the degree to which the instructed subjects (group *A* and *B*) surpassed the uninstructed (the Control group) appears to have depended upon the explicitness of the theoretical

TABLE IV.—TRIALS REQUIRED FOR MASTERY OF SECOND PROBLEM (DEPTH TWO INCHES)

Group	Mean	SD
Control	6.03	2.62
Experimental group *A*	5.37	2.28
Experimental group *B*	4.63	2.08

explanation, as may be seen from the fact that the scores for group *B* were lower than those for group *A*. Table V indicates that the differences are somewhat more reliable than those for the first problem.

TABLE V.—GROUP DIFFERENCES FOR SECOND PROBLEM (DEPTH TWO INCHES)

Groups compared	Difference between groups	SD diff.	Critical ratio	Chances in 1000
Control − *A*	.66	.63	1.05	853
A − *B*	.74	.56	1.32	907
Control − *B*	1.40	.60	2.34	990

TRANSFER FROM FIRST TO SECOND PROBLEM

It is to be regretted that no numerical data from Judd's experimentation are available. The account quoted appears to imply that transfer, as measured by improvement from the first to the second problem, took place only for the instructed group. In the present study, transfer, in the sense of improvement, occurred both with and without tuition, and in amounts not greatly differing for the three groups. Table VI shows a mean gain of 3.1 trials for each group, the relative gain being greatest for group *B*, the boys given the most complete explanation.

TABLE VI.—SUMMARY TABLE SHOWING IMPROVEMENT FROM FIRST PROBLEM TO SECOND PROBLEM

Groups	Mean of trials required		Gain in trials	Percentage of improvement
	At 6 inches	At 2 inches		
Control	9.10	6.03	3.07	34.1
Experimental group *A*	8.50	5.37	3.13	36.5
Experimental group *B*	7.73	4.63	3.10	40.3

The task of learning to hit a submerged target appears to be in the field of motor learning, and the original study generally has been interpreted as belonging to this category. However, Judd's report indicates little concern with motor skill but instead, an interest chiefly or solely in the learner's adaptation to the principle of refraction. In

the present study the motor skill element is negligible—the real problem is to discover where to aim. Once a boy made this discovery, he had no difficulty in meeting the criterion for successful performance. This statement is supported by the fact that many of the boys in each group made such significant remarks as, "I see the catch," "I got it now," and the like.

INDIVIDUAL DIFFERENCES

Within each group there were large individual differences in the speed with which the boys "saw the trick," as indicated by the standard deviations reported in Tables II and IV. Two boys in the control group, one in group *A*, and one in group *B* solved the first problem at the first shot. It seems probable that these boys knew they could not hit the bull's-eye by aiming at it, made a lucky guess, found themselves successful, and repeated. On the other hand, twenty or more shots were required for the solution of the first problem by two boys in the control group, one in group *A*, and one in group *B*. These boys took a long time to discover where to aim. In fact, they probably took a long time to discover that aiming at the apparent position of the bull's-eye would not bring success. Once this discovery had been made, it was not hard to find that the place to aim was below the bull's-eye.

POINTS OF DIFFERENCE FROM STUDY BY SCHOLCKOW AND JUDD

Certain differences in findings from the early study reported by Judd have been noted. In view of these differences, it should be emphasized that the present study does not claim to duplicate the details of the earlier one, but merely to make a fresh attack upon the same problem in a comparable manner. It would manifestly be impracticable to repeat the earlier study, in view of the limited accounts of it that are available.

The following factors may account in part or in whole for differing findings: (1) The skill studied was changed from throwing a dart to shooting an air gun. (2) The subjects were probably from two to three years older than in the earlier study. (3) The explanation of refraction may have taken a different turn. Evidence has been presented to show that a slight change in this explanation may affect results. (4) Other phases of experimental procedure may have differed. (5) The extent to which motor learning was a factor may have varied. If in the earlier study the subjects had to learn to throw

darts as well as to adapt to refraction, the task was a more complex one than that set for the subjects of the present investigation. (6) In part differences may be due to chance. The number of cases in the earlier study is not known, and measures of reliability were not commonly reported at that time. The reliability of the present results is greater than "mere chance," but less than "practical certainty."

SUMMARY AND INTERPRETATION

(1) Under experimental conditions similar to those in the original Scholckow and Judd study, knowledge of theory was found to facilitate transfer. In this respect the original findings were confirmed.

(2) However, theoretical information was of aid not only in transfer from one situation to another, but also in making the original adjustment to the first situation. This result is in contrast to findings reported in the earlier work.

(3) The definiteness or completeness of the theoretical information had a direct effect upon both initial learning and transfer. Even in as simple a problem as that presented to the subjects of this study, it is clearly important for a teacher to consider carefully the adaptation of any theoretical statement to the specific needs of the learner. In the original investigation the influence of the precise form of the theoretical explanation seems to have been disregarded.

(4) In the present study the importance of individual discovery of the solution—of the emergence of a sudden insight, in Gestalt terms—is apparent. In each group and for each problem the typical boy worked unsuccessfully for a time, then quite abruptly reached a solution. The appearance of this moment of discovery undoubtedly was hastened in many cases by the theoretical explanations provided for the experimental groups.

(5) On the other hand, the large individual differences within each group and the consequent overlapping of the various groups in speed of learning suggest that success in the type of problem presented is probably conditioned by other factors in addition to knowledge of a theoretical principle as formulated by a teacher. Such additional factors may include fluidity and variability of behavior when faced by a problem, a habit of verifying one's judgments, and the ability to formulate a general principle for oneself.

NEW WEIGHTS FOR THE RESPONSES IN THE HEILMAN PERSONAL DATA SCALE

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The Heilman Personal Data Scale is a questionnaire of thirty-two items which is to be used for collecting environmental and personal information concerning teachers college entrants which will be of value to the guidance officer and in predicting success in college.

The general items of the Scale are:

1. Intended college major.
2. Membership in organizations and participation in activities.
3. Offices held in above organizations.
4. Size of home town.
5. School subjects liked best.
6. School subjects liked least.
7. Liking for high-school subjects in general.
8. Number of hours devoted to the preparation of lessons during the last year in high school.
9. Age at high-school graduation.
10. Number of years between high-school graduation and college entrance.
11. Number in high-school graduating class.
12. Admiration of the capable student.
13. Admiration of the industrious student.
14. (*a*) Effect of physical ill health on efficiency of work in high school.
    (*b*) Effect of physical defects on efficiency of work in high school.
    (*c*) Effect of emotional upsets on efficiency of work in high school.
15. Amount of reading done supplementary to assigned classwork.
16. Effect of external distractions during studying.
17. Types of problems on which advice was needed during high-school course.
18. Traits most helpful for successful work in high school.
19. Traits which handicapped most in doing successful work in high school.
20. Age of decision upon lifework.
21. Grade level on which teaching is planned.
22. Years planned to attend college.
23. Years for which financial provision for college attendance has been made.
24. Degree of interest shown by parents in high-school work.
25. Grade or grade group last attended by father.
26. Father's principal occupation.
27. Hobbies.

28. Kinds of literature liked very much.
29. Reasons for going to college.
30. Methods most frequently used in studying lessons.

After each item is given a list of from two to nineteen possible answers, which the student checks.

1. DETERMINING THE REVISED WEIGHTS

The various items of the Scale were evaluated by means of data obtained from several thousand college entrants who had participated in the National Testing Programs of the Teachers College Personnel Association. Originally the items were evaluated on the basis of the scores made on the combined English and Elementary tests of the Teachers College Personnel Association. As the correlation of the results of these tests with grades is .69, which is as high as many coefficients of reliability for grades, the combined English and Elementary tests are a good indirect measure of college success.

To determine an assigned value for a given reply to an item, the test scores of all those students who had made that reply were tabulated; the median raw score was found and converted into a PE score. The PE scores for all of the raw scores on the two tests had previously been computed. After multiplying by ten to avoid decimals, and subtracting seventy to eliminate large numbers, this median became the assigned value of the given reply to the item. All values assigned on the basis of the test scores were determined by this method.

The revised scoring values were assigned directly on the basis of college grades, the most commonly used measure of college success. The data for determining the weights were obtained from seven teachers colleges in as many different states. Each of these colleges administered the Personal Data Scale to each of its students upon entrance to college and returned the Scales for use in the computations. At the end of the first quarter or semester the average grades made by each entrant were reported. As grades from different institutions are not directly comparable, they were adjusted according to the average score made by the freshmen on their entrance examinations. For example, the grades of a school whose freshman entrants made an average PE score of 8.4 on the combined English and Elementary tests were raised one PE and the average grade placed at 8.4 PE rather than 7.4 PE, the middle of the scale. Similarly, the grades of an institution whose freshmen tested below average were lowered. The average scores made on the combined English and Elementary tests by

TABLE I.—THE MEAN SCORE, IN TENTHS OF PE'S, MADE BY THE ENTRANTS OF EACH OF THE SEVEN COLLEGES ON THE COMBINED ENGLISH AND ELEMENTARY TESTS, FORM *B*, AND THE AMOUNT WHICH THAT MEAN VARIES FROM THE NATIONAL NORM OF TEACHERS COLLEGES

College	Number of entrants	Mean PE score on combined English and elementary tests (tenths of PE's)	Variance from national norms (tenths of PE's)
1	357	74	0
2	150	72	−2
3	101	69	−5
4	56	73	−1
5	153	84	10
6	124	78	4
7	52	72	−2

TABLE II.—THE AVERAGE GRADE IN TENTHS OF PE SCORES AND THE NUMBER OF STUDENTS IN EACH COLLEGE MAKING A GIVEN RESPONSE; THE WEIGHTED AVERAGE, THE TOTAL NUMBER OF STUDENTS MAKING THE RESPONSE, AND THE ASSIGNED VALUE FOR EACH RESPONSE TO ITEM NINE OF THE PERSONAL DATA SCALE

My age at high school graduation was:

College	*a*, 15 or under		*b*, 16 or 17		*c*, 18		*d*, 19		*e*, 20 or over		No answer	
	G.	No.	G.	No.	G.	No.	G.	No.	G.	No.	G.	No.
1	80	3	74	198	71	118	69	19	69	5	71	14
2	...	0	73	83	72	50	69	14	71	3	..	0
3	...	0	75	64	71	20	68	10	66	3	66	4
4	...	0	73	31	73	22	60	2	...	0	74	1
5	100	1	79	106	80	38	80	6	...	0	64	2
6	81	1	80	91	73	27	89	3	62	1	86	2
7	...	0	76	25	71	24	58	3	...	0	..	0
Weighted average	84	..	76	...	73	...	70	..	68	..	71	
Total number	...	5	..	598	..	299	..	57	...	12	..	23
Assigned value	14	..	6	...	3	...	0	..	−2	..	1	

the entrants of these seven schools varied from 69 to 84 (in tenths of PE's), as shown in Table I.

To illustrate this method of determining the assigned weights for the various responses, the data for Item No. 9 are given in Table II. For each of the seven colleges are given the number of students making each response and the grade average made by them. The weighted average, based on the responses obtained from all of the colleges, was found by multiplying each average by the number of students, summing the products and dividing by the total number of students. The assigned value, given in the last line, is the weighted average minus seventy.

2. EVALUATING THE ASSIGNED WEIGHTS

In order to determine which of the two series of weights—that based on test scores or that based on college marks—would give a total

TABLE III.—COEFFICIENTS OF CORRELATIONS WITH THEIR PE'S BETWEEN COLLEGE GRADES AND SCORES MADE ON THE PERSONAL DATA SCALE BY FRESHMEN ENTERING COLORADO STATE COLLEGE OF EDUCATION IN THE FALL OF 1938

	Men	Women
Grades for one quarter, Fall, 1938.[1]		
Number of students	161	276
Original scoring	.465 ± .042	.337 ± .036
Revised scoring	.472 ± .041	.420 ± .033
Grades for one year, 1938–1939.		
Number of students	141	259
Original scoring	.362 ± .050	.318 ± .038
Revised scoring	.369 ± .049	.412 ± .035

[1] Heilman, J. D.: *The* 1939 *Report on the Coöperative Testing Program of the Teachers College Personnel Association*, p. 42.

score most predictive of college success, correlations were computed between each of the two sets of scores for the Personal Data Scale and college grades.

For six out of seven schools for which the data were complete, coefficients of correlations were computed between grades and the results of the original weighting and of the revised weighting of the scores of the Personal Data Scale. The average of each series of six coefficients was then computed. The average correlation between grades and the original scoring was .330 ± .020 and between grades

and the revised scoring, .498 ± .017, .168 higher. This difference would definitely show the superiority of the revised scoring, if it were not for the fact that spurious correlation is present because the same grades were used in computing these correlations as were used in determining the weights to be assigned to the items of the Scale.

In order to eliminate this overlapping the results from an entirely new group of students, the freshmen entering Colorado State College of Education in the Fall of 1938, were compared. The results for the men, given in Table III, show no practical difference between the correlations of grades with the original scoring of the Personal Data Scale and of grades with the revised scoring. The differences between the correlations for the women are .083 ± .022 and .094 ± .028. These differences approach statistical reliability both when the grades for one quarter and when the grades for the entire freshman year are used.

3. THE VALUE OF THE SCALE IN PREDICTING COLLEGE SUCCESS

The data obtained from the entrants of the six teachers colleges were used in evaluating the Scale. In Table IV are listed the multiple *R*'s which were computed between various tests and combinations of tests and grades to determine the tests most effective for predicting grades. It was found that the one test yielding the highest coefficient with grades was the English Test; the two-test combination yielding the highest coefficient, the English Test and the Personal Data Scale;

TABLE IV.—THE MULTIPLE *R*'S WITH THEIR PE'S, BETWEEN COLLEGE GRADES AND THE SCORES MADE ON VARIOUS TESTS BY THE 892 ENTRANTS OF SIX TEACHERS COLLEGES IN THE FALL OF 1937

1. College grades for one quarter or one semester.
2. American Council Psychological Examination.
3. English Test.
4. Elementary Test.
5. Personal Data Scale—revised scoring based on grades.

$$R_{1(23)} = .573 \pm .015$$
$$R_{1(24)} = .541 \pm .016$$
$$R_{1(34)} = .597 \pm .014$$
$$R_{1(25)} = .563 \pm .015$$
$$R_{1(35)} = .616 \pm .014$$
$$R_{1(45)} = .604 \pm .014$$
$$R_{1(234)} = .598 \pm .014$$
$$R_{1(235)} = .617 \pm .014$$
$$R_{1(245)} = .606 \pm .014$$
$$R_{1(345)} = .635 \pm .013$$
$$R_{1(2345)} = .638 \pm .013$$

the three-test combination, the English Test, the Elementary Test and the Personal Data Scale. It is of interest to note that, in combination with other tests, the Personal Data Scale is more valuable than the American Council Psychological Examination in predicting college success. This is probably due to the fact that most of the elements measured by the Psychological Examination have already been measured by the English and Elementary tests, whereas, the Personal Data Scale is made up of new factors not measured by the other tests.

4. CONCLUSIONS

Although further research with different groups of students is needed before the true value of the Scale can be determined, the present study shows that it does have value for predicting college success.

Norms are available which are based on the results of approximately twenty-five hundred Personal Data Scales filled in by entering freshmen in eleven teachers colleges. The Scale is easily administered, as the directions are simple and there are no time limits, and it may be completed within from twenty to twenty-five minutes. In addition to its distinctively characteristic value for predicting success in college, the Heilman Personal Data Scale contains many items which furnish information concerning the student which are invaluable in counseling and are often recorded on his permanent cumulative record.

A NOTE ON DUBOIS'S METHOD OF DERIVING AN ACHIEVEMENT RATIO FOR STUDENTS

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In a recent issue of this JOURNAL there appeared an article[1] upon the use of an "achievement ratio" with college students which if applied without an appreciation of its real nature will lead to erroneous conclusions. The essence of the proposed method was to determine (1) each student's standard score on the psychological examination, $(X - M_x)/\sigma_x$, (2) the mark which corresponds to that standard score on the marking scale, and (3) the ratio of his actual average mark to the mark expected from (2). It was found by the author of the article that in general students high in the psycholgical test had low achievement ratios and students low in the psychological test had high achievement ratios.

This result should have occasioned no surprise, and the general conclusion to the effect that there is a negative correlation between scholastic ability and relative achievement is based upon a statistical artifact. The secret of the artifact is that DuBois has assumed a correlation of +1.00 between test scores and marks, whereas the actual correlation he gives is only +0.442. One should expect the general result as regards achievement ratios determined by his method, from the facts of regression. The regression line is actually only 44.2 per cent as steep as he has assumed. A student's expected achievement is on a regression line which is of lesser slope. One should not expect a student with a high psychological score to deviate as far above the mean of the marks as his standard score suggests, but only 44.2 per cent as far. Likewise, a low-ranking student should not be expected to fall so far below the mean as his standard score suggests, but only 44.2 per cent as far.

In order to see what kind of achievement ratios should be expected if, to take a special but meaningful case for the sake of argument, we consider only the students whose achievements fall on the regression line whose slope is $.442\ \sigma_m/\sigma_p$, where σ_m is the standard deviation of the marks and σ_p is the standard error of the psychological test scores.

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[1] DuBois, P. H.: "Achievement ratios of college students." *J. Educ. Psychol.*, Vol. xxx, 1939, pp. 699–702. I am indebted to Mr. H. M. Cox for a critical review of the ideas in this note.

Taking, for illustrative purposes, nine students whose scores on the psychological examination are just one-half standard deviations apart, we find their scores to be as given in column 1 of Table I. The mean of the scores is given as 190.97 which in Table I is assigned the whole number 191. The standard deviation of the distribution of scores is given as 55.08 which for convenience has been called 55, to make it a simple whole number.

In column 2 of Table I are given the expected marks for these nine students, assuming a correlation of +1.00. These scores are also at one-half SD units, the mean of the marks being 1.338 points and the standard deviation being .678 points. If the nine students had made exactly these marks their achievement ratios would have been exactly 100, where the achievement ratio is given by the formula

$$AR = \frac{100M''}{M'}$$

M'' being the obtained mark, and M' the expected mark.

In column 3 of Table I are given the expected marks of these nine students, assuming a correlation of 0.442 between scores and marks. According to our special case, which may be taken as representative of all obtained marks, we may use these nine marks as actually obtained marks. The ratio of M'' to M' gives in each case the basis of the expected achievement ratio by DuBois's method for students having the psychological scores in column 1. The ratios M''/M' are given in

TABLE I

P, psychological test scores	M', predicted mark when $r_{mp} = 1.00$	M'', predicted mark when $r_{mp} = 0.442$	Expected achievement ratio $100M''/M'$
301	2.694	1.937	72
274	2.355	1.788	76
246	2.016	1.638	81
219	1.677	1.488	90
191	1.338	1.338	100
163	0.999	1.188	119
136	0.660	1.038	157
108	0.321	0.888	277
81	−0.018	0.738	

column 4, multiplied by 100 to make them comparable with achievement ratios. It can readily be seen that for the better students the ratios are smaller than for the poorer student. The picture is even more radical than that suggested by DuBois's results. It is even possible that had he used the regression line for r equal to 0.442 as his base, he might have found that the achievement ratios of good students are even greater than those for the poorer students, thus reversing his final conclusion! There may be some good reasons for using the DuBois plan and not the substitute procedure suggested in this note, but the reasons are yet to appear. The alternative plan implied in this note is to find each student's expected mark on the basis of the usual regression equation,[1] find the ratio of his obtained mark to his expected mark and multiply by 100.

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[1] Guilford, J. P.: *Psychometric Methods.* New York: McGraw-Hill Book Company Inc., 1936, p. 336.

BOOK REVIEWS

TRUMAN L. KELLEY. *Talents and Tasks: Their Conjunction in a Democracy for Wholesome Living and National Defense.* Harvard Education Papers, No. 1. Cambridge, Mass.: Graduate School of Education, Harvard University, 1940.

In the conventional methods of testing it has generally been assumed that it is desirable to measure man in terms of traits which characterize him as a useful member of society. The fact that such talents may also serve to bring the possessor certain personal satisfactions in life, and that they should be evaluated also for this purpose, appear to have been largely overlooked. Professor Kelley argues that all human activity depends upon the exercise of human talents and that these talents serve two purposes: They assist in the creation of material values and goods necessary for social life, and they also bring to their possessors the personal satisfactions that life holds. The democratic problem as he sees it "is so to utilize the talents of our differentially endowed and trained citizens as to *maximize* their satisfactions *and* their social productivity. That is to say, we seek a mode of individual functioning which gives the dual return of satisfaction and welfare to the individual, and goods and attitudes of value to society" (pp. 5–6) (italics mine). This is truly a sound idea and one for which Kelley deserves much credit not only for phrasing it so clearly but also for providing a statistical scheme of solution. In these critical times it is particularly important that all concerned with the evaluation of talent in the interest of national welfare give heed to Kelley's thesis. His scheme should result in much less incompetence and maladjustment than occurred in the last World War when the importance of individual welfare was not so explicitly recognized in the evaluation of talent.

Kelley has coined the word "consociation" with the specific meaning—"the association of individual welfare and social need" (p. 6). The general statistical problem is to determine the maximal consociated relationship (canonical correlation) between a combination of social utility measures on the one hand, and individual welfare measures on the other. This analysis leads to a number of consociated activities arrayed in diminishing order of importance.

It is suggested that the fitness of an individual for a particular job may be judged by the extent to which he conforms to type with respect to the various consociated activities involved. This fitness can be objectively determined by making a profile of the average participant

for this job, and also one for the particular individual being judged. The smaller the discrepancy between these two profiles, the better is the individual fitted to do the type of job. If a man's profile is well above that of the average participant it is presumptive evidence that he is fitted for a different and more advanced job.

Professor Kelley's basic idea is excellent and the statistical scheme of analysis appropriate and sound. He has sensed an important problem and offered at least a partial solution for it. All those interested in test construction should read his book, and all those responsible for army testing should be especially concerned to do so.

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University of Chicago.

I. L. KANDEL. *Professional Aptitude Tests in Medicine, Law, and Engineering.* Bureau of Publications, Teachers College, Columbia University, New York, 1940, pp. 78.

This monograph makes it clear that more has been accomplished with respect to the development of prognostic tests for medical students than for students in either law or engineering. The first thirty pages describe in some detail the activities of the Association of American Medical Colleges, under the leadership of F. A. Moss, to construct a test that would predict academic success during the first year in medical school. A typical correlation between scores on the Moss test and first-year grades for the year 1937 was +.60. In each of the studies reported there was considerable variation so far as the prognostic value of this test is concerned from medical school to medical school. Officials at the University of Minnesota, for example, found the Moss test quite unsatisfactory, and Stuit[1] has just reported correlations of Moss test scores with first-year medical school grades at the State University of Iowa of +.23 and +.32.

In the second section of the book Kandel states the theoretical reasons for selecting certain students who should go on to study law, and continues with a historical description of the prognostic testing which has had such selection as its aim. The Ferson-Stoddard Law Aptitude Test was given to a number of pre-law students slightly more than ten years ago, and the correlation with freshman law grades approximated +.50. Crawford developed a similar test at Yale, which

[1] Stuit, Dewey B.: "The Prediction of Scholastic Success in a College of Medicine." *Educational and Psychological Measurements*, Vol. I, 1941, pp. 77–84.

yielded a correlation of +.78 with first year law grades. Despite these high correlations, however,

> the few institutions which have tried an aptitude or capacity test have abandoned it and have returned to the college record as the most important basis for selection. (p. 56)

Prognostic tests for engineering students have had the longest history of all professional aptitude tests. There has been developed, however, no "engineering aptitude test," but many commonly employed achievement and prognostic examinations have been used. Tests measuring mathematics achievement and mathematics aptitude have been most useful.

Kandel's book is informal and not very critical of the methods involved in the construction or evaluation of tests. He writes with a decided historical emphasis and his non-technical discussion will be of interest to the administrative officers of professional schools as a description of the status of academic prediction in medicine, law, and engineering. The monograph will make little appeal to professional students of measurement or guidance because the author does not attempt "to undertake the more technical study of the validity and reliability of the tests used." (p. ix)

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GUSTAV G. SCHOENCHEN. *The Activity School: A Basic Philosophy for Teachers.* New York: Longmans, Green, 1940, pp. 359.

Dr. Schoenchen's book is based upon a doctoral dissertation comparing American activity schools under the influence of the educational philosophy of John Dewey with the Vienna activity schools of Eduard Burger, "Europe's foremost historian and critic of activity pedagogy." Part One begins by tracing the origins of activity pedagogy in the work of the great educators from Comenius to Herbart, and then pointing out the general features of the European form of activity pedagogy as it has appeared in various contemporary (pre-Hitler!) educational movements in Europe. This historical treatment, sketched too lightly to be quite satisfying, is followed by (*a*) rather limited evaluation of activity education on both theoretical and practical grounds. Part One concludes with a definition of the activity school in terms of its aim—the ideal man, and with a fairly practical analysis of what is meant by activity pedagogy.

In Part Two the author describes the methods of the activity school —empirical, logical, and technical heuristics, which aim to stimulate the

pupil, respectively, in the processes of ideation, judgment, and expression. The descriptions are amply and concretely illustrated, and the discussion is quite practical.

Part Three is devoted chiefly to a comparison of the educational philosophy and practice of John Dewey with the theory and practice of the European activity school, a discussion in which the fundamental agreement is so apparent that the points of difference seem unnecessarily exaggerated and labored. The book closes with certain conclusions and recommendations, or, as the author prefers to describe them, "certain attitudes toward characteristic, large-unit, educational problems."

It may be, as Professor Radosavljevich suggests in his Foreword to the book, that Schoenchen has effected a synthesis between "Dewey's theory and Burger's practice" which is "capable and worthy of becoming a 'basic philosophy for teachers' "; but it is considerably more apparent to this reviewer that the author has carried on a thorough search of the history of education and a scholarly analysis of Twentieth Century European educational movements, has written a concise and practical description of the methods of European activity pedagogy, and has made a careful, though somewhat pedantic, comparative study of the European activity school and the American educational movements which derive from Dewey. The book undoubtedly clarifies both the theory and the practical methodology of activity pedagogy, but it does not create the conviction that "modern pedagogy can be no other than activity pedagogy."

This failure to convince is partially the fault of the author. His evaluation of activity education in Part One is neither extensive nor profound and offers rather meagre evidence for the superiority of the activity over the "traditional" school. Moreover, in this "Critique" the author is occasionally contradictory in implication if not in statement, is sometimes quite dogmatic, and displays serious limitations in his understanding of modern psychology.

On the other hand, it is frequently the case which seems unconvincing. It is difficult to understand, for instance, why there must be an implied dichotomy between the activity school and the "learning" or "traditional" school. Repeated comparative analyses of the two are made throughout the book, always with the suggestion of the one *versus* the other. Is the activity movement anything other than an attempt to inject the methodological principle of pupil self-activity into educational procedures? Is its philosophical and psychological sub-

stratum basically different from that of American, or any other, progressive education? Schoenchen insists that the aim of activity pedagogy is "the ideal man," whereas the aim of pedagogical individualism is the personality. This is a difficult distinction to appreciate, and it is equally difficult to understand what the author can possibly mean when he says, "The activity school finds the goal of personality too *vague and unstable*, and sticks to its *constant* aim—the ideal man." (Italics inserted by this reviewer.)

In contrasting activity pedagogy with the educational theory of Dewey, the author stresses as a basic distinction the fact that for Dewey the aim of education is to construct the ideal society, while for the activity school it is to construct the ideal man. "And our pedagogue," he says, "has this great advantage over Dewey's pedagogue; he knows that the perfect society will come, when the perfect man comes, that the perfect society is but a function of the perfect man; while Dewey's pedagogue must grope stumblingly toward a perfect society without knowing what that perfect society is. No one has depicted the perfect society; . . . " Can a better case be made for the perfect society as a function of the perfect man than for the perfect man as a function of the perfect society? Can Schoenchen depict any more satisfactorily that perfect man which activity pedagogy apparently knows so well?

In the opinion of many educators, activity pedagogy and the activity school have already been the subject of an unwarranted amount of theoretical and allegedly practical discussion. This opinion is not likely to be altered by Schoenchen's book. CARLETON F. SCOFIELD.
University of Buffalo.

L. H. FLINT, W. J. HOMAN, V. C. MICKELSON, U. RICCIARDI, H. E. TYLER, AND H. T. TYLER. *Learning to Live* (Ed. by H. E. Tyler). New York: Farrar and Rinehart, 1940, pp. 473.

This book, written by individuals connected with junior colleges either as instructors or administrators, was planned to "give some practical suggestions which will be of help to the student in learning to live in college and after he leaves it." Unlike many books on orientation which aim to give the student some acquaintance with various fields of knowledge, this treatise is concerned with the adjustment of the student. Learning to live, the authors say, is to be achieved by changes in one's personality through "experiences in such a way as to live more effectively." Sections of the discussion are concerned with

living in college, living with yourself, living with your family, living with others, learning to make a living, living in the community, and living in the world. Problems are briefly stated and aids to their solution are outlined.

This text may serve as a useful outline of a course concerned with adaptation of junior-college students. The success of such a course, however, will depend largely upon the ability and skill of the instructor. The advice that the student read all the one hundred thirty-one reference books is optimistic rather than practical, since he has neither the time for such extensive reading nor the ability adequately to assimulate much of it.

Too little emphasis is placed upon the need for adequately trained full-time counselors to whom the students may go with their problems. Obviously the instructor who devotes only a small part of his time to student counseling can deal satisfactorily only with minor problems.

Learning to Live will be found useful mainly in acquainting students with problems which they must face rather than in providing adequate solutions to those problems. It is interesting and well written. Furthermore, it helps to place in proper perspective the need of student guidance in junior colleges.

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Science, Philosophy, and Religion: A Symposium. Conference on Science, Philosophy and Religion in their Relation to the Democratic Way of Life, Inc., New York, 1941, pp. 443.

These twenty-four papers which were read at the Conference on Science, Philosophy, and Religion in New York City last September, and which were written by eminent scientists, philosophers, and religionists, represent in the words of Van Wyck Brooks an effort to "face the crisis in our culture by an experiment in corporate thinking." The various authors were convinced that their own disciplines and traditions were more compatible with democracy than with totalitarianism and, hence, they had united to combat a doctrine destructive of all.

The reviewer read enough of the chapters to be convinced that the volume would have little technical appeal to the readers of this JOURNAL. He recognized the names of no psychologists among the authors of the papers, and only one appeared in the roster of seventy-nine "Founding Members." As a record, however, of the intellectual

confusion of our times, and of the "analyses" and "ways out" which occur to outstanding scholars, the book is to be recommended. The authors—scientists, philosophers, and religionists—wrote frequently as if they were badly frightened. There were many statements such as: "Democracy is on trial for its life" (p. 21); "Today two ways of life . . . struggle for world domination" (p. 36); "Our culture in its present *Sensate* phase . . . " (p. 90); . . . "democracy is bleeding from its internal wounds . . . " (p. 139); and "Totalitarian structures . . . have an immense mechanical advantage . . . " (p. 229). A considerable amount of this fear is transmitted to the reader, which is probably as much as result of the Zeitgeist—if a German word is still permissible—as it is a compliment to the persuasiveness of the authors.

STEPHEN M. COREY.

University of Chicago.

A. P. GOSSARD. *Superior and Backward Children in Public Schools.* Chicago: University of Chicago Press, 1940, pp. 172.

The author has assiduously culled his material from the "annual" report of superintendents and boards of education in ten of our largest cities through the period 1870–1939. Probably the majority of students will feel that this admirable survey of the treatment of deviate children might have been presented in a more exhaustive fashion. The history of administrative efforts to contend with the broader aspects of individual differences is too important a research to be adequately conveyed in such a brief vehicle. The methodology of approach to the problem is, nevertheless, quite stimulating. One's greatest regret is that the author has refused to commit himself to comment or criticism and inexcusably neglects to point the way to future action in the light of his investigation.

LEONARD KOGAN.

University of Rochester.

HERBERT SORENSON. *Psychology in Education.* New York: McGraw-Hill, 1940, pp. 489.

This volume continues a recent trend in educational psychology in which considerable emphasis is placed upon emotional and social adjustment as factors in the development of the student.

Before preceding to a more detailed consideration of the author's treatment of certain topics, attention should be called to two aspects of the book which greatly enhance its usefulness. Each chapter is

prefaced by a section in which the important points for study in the chapter are indicated. This aids greatly in establishing a desirable set on the part of the student. In addition a comprehensive glossary of psychological and educational terms is appended.

The introductory chapter deals entirely with the recent growth in the literature of educational psychology. Nothing, however, is said of the nature and scope of educational psychology nor of its place in fields of education and psychology. The topics of physical growth and development and social development are adequately treated in two subsequent chapters.

Chapters 4 and 5 treat of the physical aspect of emotion and emotional and personal adjustment, respectively. The various forms of maladjustive behavior which may characterize attempts to restore self-confidence, when the individual is confronted with feelings of inferiority and failure, are very well presented and interpreted in terms of problems which confront children of school age. Behavior problems and their relation to mental health and discipline are treated in chapter 6.

Intelligence, its characteristics, measurement and relation to school success are treated in the three subsequent chapters. The author's presentation of the development of intelligence tests is to be commended. The nature of individual and group tests of intelligence is extensively considered. It is to be regretted that the rather important field of performance testing did not appear to the author to merit consideration. The fact that the average teacher is unlikely to encounter the need for tests of this character doubtless influenced the author's selection of topics. Educational adjustment to individual differences in intelligence is treated at some length in the last of these three chapters.

The relative rôles of heredity and environment in mental development are treated in chapter 10. In evaluating the evidence garnered from many sources the author is careful to avoid over-emphasis upon either of these factors. The results of the recent *Iowa studies* are presented with the caution that they have found little corroboration in the researches of other investigators. Difference between identical twins reared apart and the demonstrated relation between intelligence and school attendance are presented as the findings most striking supporting the environmentalist's claims. The most striking corroboration of the fact that children possess innately different potential capacities, which are not equalized by environmental forces, lies in the

comparative ages and abilities of the youngest and oldest pupils in any given grade.

Chapters 11 and 12 are devoted to the principles of learning and the course of growth and development through learning. Memory is discussed in chapter 13. In itself this chapter leaves much to be desired. This defect is remedied, however, by the material contained in a subsequent chapter (16) on studying effectively. It might be desirable to introduce this latter chapter considerably earlier in the course than its position in the text implies. Most students seem to benefit from its study. The reviewer has tried using it immediately after introducing the class to the subject of educational psychology with more than passing success.

Chapter 14 presents more or less traditional material on interest, incentives and motivation. It is unique in that it devotes several pages to the visual aids and learning. Chapter 15 likewise presents the customary material on the effect of fatigue, drugs, and atmospheric conditions upon learning.

Learning through transfer is the subject-matter of chapter 17. In the reviewer's opinion this chapter is the weakest link in the entire volume. It is not that the author misplaces emphasis nor subscribes to questionable doctrines of transfer of training. Rather he is to be commended on his orientation in this respect. The failing of this chapter in the reviewer's opinion lies in the author's failure to present more of the experimental findings. The shortcomings in this respect are shown by the fact that only seven studies are directly cited in the text. This failure to present in greater detail the multitude of experimental findings, particularly with respect to certain generalizations made by the author, is unfortunate in view of the importance of this topic for educational procedure and the misinformation rampant among students in general on the facts of transfer of training.

The activity and project method of teaching is discussed in chapter 18. This discussion suffers to some extent from the same shortcomings which characterize the treatment of the topic of learning through transfer, *i.e.* the findings of many recent investigations are not mentioned. Despite this fact, however, an attractive and convincing case is made for the activity method.

The concluding chapters deal with the topic of educational measurement. The treatment accorded these topics is to be commended. A discussion of the more common statistical concepts to be found in this text is appended.

As a whole, this volume represents a valuable contribution. It has proven very teachable and for the most part the subject-matter is more than adequate, as has been indicated in the foregoing discussion. The continuation of the recent trend wherein emphasis is placed upon social and emotional adjustment in addition to the more traditional topics is heartening. *Psychology in Education* not only continues this trend in a noteworthy and highly satisfactory manner but it improves over its predecessors in that the results of experimental investigations are, in general, more copiously cited.

J. M. Porter, Jr.
Carnegie Institute of Technology.

Ruth Strang. *Pupil Personnel and Guidance.* New York: The Macmillan Co., 1940, pp. 356.

A comment anent psychological counseling made by Dr. Strang may aptly be applied to pupil personnel and guidance. Each field may be described as "a developing rather than a developed function. It is not well defined nor thoroughly understood." As one surveys the literature on pupil personnel one finds everything from child accounting to child guidance clinics represented, often with the definite indication that the particular narrow area is personnel work. For many teachers personnel and guidance are strange words, hardly a part of their vocabulary and certainly having no functional relations to their everyday work. It is the purpose of this book to make these words real entities to teachers and student-teachers. In this purpose Dr. Strang's evident knowledge, breath of vision, and sane exposition have succeeded—it only remains to ensure that teachers read the book.

Education and school operations have meaning only in so far as they recognize the child's wellbeing and growth as their fundamental objectives. A guidance point of view, requiring interest in the needs of each individual child is the *sine qua non* of education in this sense. Every part of the school program must play a part in guidance work. Dr. Strang discusses succinctly the physical environment, administrative procedures, group activities, curricular and extra-curricular problems as they relate to guidance, and then describes the contribution of the superintendent and principal, the classroom teacher, the homeroom teacher, and of such specialists as the dean, school physician, psychologist, visiting teacher, psychiatrist, and the vocational guidance expert.

This book is not an exhaustive, scientific treatise on guidance, but rather an elementary, general textbook or handbook. Thought pro-

voking questions at the end of each chapter, adequate documentation, and an excellent annotated list of further readings make the book useful not only for classroom use, but also for independent study on the part of the teacher in service.

C. M. LOUTTIT.
U. S. Naval Medical School.

C. H. SIEVERS AND B. D. BROWN. *Improving Your Eye Movements in Reading* (with Methods Manual, 43 pages). Wichita: McGuin Publishing Co., 1940, pp. 81.

It is suggested that reading "authorities" classify themselves into (1) those who state that it is desirable to develop rhythmic eye movements and that faulty eye movements are a cause of poor reading, and (2) those who consider that eye-movement patterns reflect central factors of perception and assimilation and, therefore, are merely symptoms of reading proficiency. Assuming that this is so, one should make the additional statement that the former group consists of people who have an inadequate knowledge of the reading process. The methods for the improvement of reading developed by such individuals, therefore, should be rejected as invalid and misleading. Too frequently, however, certain naive educators accept this material either because it sounds plausible or because it is sponsored by an "authority" with some prestige in the educational field. An acceptance of this view tends to foster the concept that reading is mainly a mechanical process which is deleterious to sound progress in reading. Furthermore, it tends to divert attention from the assimilation and thinking side of reading which is highly important.

This manual violates many of the fundamental principles which should form the basis for reading methods. A few examples will indicate some of the inadequacies. Great emphasis is placed upon the development of rhythmic eye movements as if the possession of these was an important criterion of effective reading. That this emphasis is absurd is shown by the experimentally demonstrated fact that reading without any comprehension at all may produce perfect eye-movement rhythm. The efficient reader is not the rhythmic reader but rather the person who shows versatility and adaptability in adjusting to variations in the reading situation. The eye-movement patterns of such a reader will vary according to the demands of the text upon the perceptual and assimilative processes. Apparently in another instance it is naively assumed that if a line of print is separated

into three groups of words that paced eye movements will result in reading each group with one fixation. Even though second-grade children read with 10.7 fixations per line, sixth-grade pupils with 7.3, and college students with 5.9, the authors attempt to train their pupils to read with 3 fixations per line. One should also condemn the use of averages derived from the counting of eye movements by children. Such scores are so inaccurate that they can have no meaning. Finally there is little excuse for the reading of lines of unrelated words or phrases.

This manual is a good example of the extremes to which the ritual of training eye movements can be carried. Unfortunately there are many who will accept it as sound educational procedure.

MILES A. TINKER.

University of Minnesota.

GEORGE M. WILEY, JR. *The Redirection of Secondary Education: A Social Interpretation.* New York: Macmillan, 1940, pp. 493.

Wiley's book is a plea for an integration of "the whole system of education with our economic and social life." It begins with a discussion of the responsibilities of education in general, and secondary education in particular, to a democratic society; and it then proceeds to evaluate the progress which modern secondary education is making toward the fulfillment of these obligations. The theme is timely and vital, for there is great danger that in the current focusing of our attention upon the military, industrial, and political demands of a "National Emergency," we may neglect the most important source of salvation for the future of our democratic society, the development of the social, moral, and intellectual personalities of our children, of those who must carry on when this "emergency" is over. The author is entirely right in his enthusiastic insistence upon a redirection of secondary education in the light of a basic philosophy of "wholesome and purposeful social living," and his analysis of the steps which have been taken and must be taken seems to this reviewer quite sound.

For the professional educator, however, particularly if he is active or even moderately informed in the sphere of secondary education, the book can have little value, since the same things have been better and more incisively said elsewhere. Indeed, Wiley's profuse use of quotations—thirty-two of them in the forty-three pages of the second chapter—would seem to suggest that he is in agreement with this opinion.

For the layman, the book may be of considerable interest and quite revealing. Such a reader, if he has no children in the secondary school and is consequently only vaguely aware of what is occurring there, may be enormously enlightened (and possibly quite astonished) by the author's discussions of the social significance of the secondary-school enrollment, of the various types of secondary schools, of the curriculum and instructional materials, of the administrative organization, and of the function of such specific services as the library, laboratory, assembly, and homeroom. If, on the other hand, the reader belongs to that rather numerous group of parents who are kept in a state of chronic perplexity by the apparent vagaries of the high-school activities of their children, these same discussions may go far toward assisting him to an understanding and an appreciation of the *raison d'etre* for the secondary school doing things so differently from "the way they did them in my day."

Wiley is Associate Commissioner of Education for the State of New York and, therefore, speaks with considerable understanding and authority. It is unfortunate that wordiness, a wearying repetition of ideas, and an excessive laboring of points cause so much of his book to be such dull reading. One suspects that he has hastily organized a mass of notes instead of reflectively recording a sequence of ideas.

In conclusion, this reviewer is impelled to confess the sympathetic pleasure he derived from the charge and the challenge which Wiley incidentally in the development of his thesis throws at higher education. After hearing college and university faculties for many years, with almost routine regularity, blame the secondary schools for all manner of deficiencies in the student, it is refreshing to hear such matter-of-fact references to the deterring and stifling effect upon progressive secondary education which has been exerted by the institutions of "higher learning." Possibly the deficiency lies less in the student which the secondary schools send to the university than in the imagination of those who tell them what to send.

CARLETON F. SCOFIELD.

University of Buffalo.

C. J. WARDEN, T. N. JENKINS, AND L. H. WARNER. *Comparative Psychology, Vol. II, Plants and Invertebrates.* New York: Ronald, 1940, pp. 1,070.

This volume is the second of a three volume treatise on Comparative Psychology. Volumes I, *Comparative Psychology—Principles and*

Methods, and III, *Comparative Psychology—Vertebrates*, have already appeared. The scope and comprehensiveness of these volumes render them exceptionally valuable to psychologists and biologists. It is suggested by the authors that the work as a whole is intended to serve as a textbook for advanced courses in comparative and genetic psychology as well as a reference work in connection with more specialized fields in psychology.

The present volume deals with the behavior of plants and the several invertebrate phyla. The chapter on plants was contributed by Warden, those on the invertebrate groups by Jenkins. There are seven chapters in all: Chapter 1—Protista, Isolated Cells and Tissue Cultures; Chapter 2—Metaphyta; Chapter 3—Porifera and Coelenterata; Chapter 4—The Echinodermata; Chapter 5—Platyhelminthes, Nemathelminthes, Trochelminthes, and Annulata; Chapter 6—Mollusca; Chapter 7—The Arthropoda. There are appended extensive bibliographies for each chapter; in all, approximately five thousand different references are cited. There are one hundred sixty-eight illustrations.

Each chapter treats first of receptive capacities and finally of reactive capacities of the phylum under consideration. While its usefulness as a text might have been greater had the more conventional topical arrangement been followed, its value for reference purposes, for which these volumes will undoubtedly be most appreciated, is probably enhanced by the method of phyletic presentation employed.

J. M. Porter, Jr.

Carnegie Institute of Technology.

Paul A. Witty, *et al.* *Mental Health in the Classroom.* Thirteenth Yearbook, Department of Supervisors and Directors of Instruction, National Education Association, Washington, D. C., 1940, pp. 271.

This Thirteenth Yearbook of the Department represents an effort both to develop a point of view regarding mental hygiene and to provide the educational practitioner with examples of good mental hygiene practices in schools. For this purpose a three-fold presentation has been made. Section I deals with "the basis of mental health," Section 2 with "living and growing in wholesome schools" and Section 3 with "mental health and teacher growth."

There can be little doubt that, for the classroom teacher, Part Two will prove both the most acceptable and the most useful section of this

Yearbook. This section is written by teachers, and describes their efforts to provide more satisfactory conditions for wholesome child development in the school. Here one gets the feel of live school atmospheres, of working, playing, growing children that the rest of the Yearbook quite naturally cannot give. We need more of this kind of analysis of experience by intelligent and articulate teachers.

Section I on the basis of mental health is good, solid reading for the practitioner who knows the lingo and has some background of information from a study of the literature on child development. The sensitive reader should not let the first chapter discourage him. If he knows children he will know that not all of child life is made up of repressions, inhibitions, thwartings, and fear. One wonders why a point of view regarding mental hygiene could not have been presented that gave at least a slight inkling of the joy and happiness of childhood. Even though this first chapter is depressing and a bit misleading, the reader will be rewarded by passages of unusual clarity and insight. For example this statement: "To a very large extent, therefore, we may say that the problems facing the adolescent have significance not only as threshold adjustments to mature life, but as revivals and reinforcements of all the emotional conflicts, anxieties, guilt feelings, perplexities, and resentments that the individual has experienced in earlier life." A broad concept of mental health is developed, one inclusive of all our efforts to foster wholesome growth and development. One of the most rewarding chapters is Dorothy Baruch's discussion of "teacher's work with parents."

The third section on the mental health of teachers is disappointing. One has the feeling that it might better have been written by teachers, rather than by an administrator and an educationist. The writers of this section never quite come to grips with the real and personal problems of the teacher's mental health. Perhaps this problem might well be the subject of another yearbook. As a matter of fact, the second section on school practice gives more real insight into the mental health of the teacher than does this third section.

What use can teachers make of this Yearbook? When it was presented at the recent meeting of the Department, much was said about getting parents to read it. It is very doubtful that this could be done when so much of the content is as heavy as it is. Teachers most certainly should read it, discuss it, criticize it. Both teachers and parents ought to profit much from the excellent bibliographies provided. Paul Witty and his committee have given us an excellent

point of view and some fine examples of how the point of view can be practiced. GEORGE E. HILL.

University of Pennsylvania.

FRIEDA K. MERRY AND RALPH V. MERRY. *From Infancy to Adolescence.* New York: Harpers & Brothers., 1940, pp. 330.

The status of the child in the Nineteenth Century is aptly expressed in the cliché, "children should be seen but not heard." With each passing decade of the Twentieth Century children are not only seen and heard, but, what is more important, they are thought about. The change is shown in the restriction on child labor, in the changing philosophies of educational method, in the White House Conferences, in nursery education and the child guidance clinic, and finally in the new technical rather than sentimental interest of parents in their children's growth and well-being. For the parent and the schoolteacher many books have been written and many courses conducted. With accelerating additions to the research literature on child development it is desirable that there be frequently published books designed to integrate the research for non-professional students without sinking to the level of the usual popular vagaries. It is a book of this sort which the Merrys have most successfully written.

The authors expressly state that their text was designed for introductory courses in child development in teacher-training institutions and for parent discussion groups. In a prologue they repeat many of the common questions asked by parents, and then promise to give answers to them. It appears to this reviewer that they have fulfilled their promise most adequately. There are chapters on methods of studying children, the natal and neonatal periods, the development of motor habits, language, intelligence, learning, emotion, play, artistic behavior, and reading, on the influence of the radio and movies, and personality, social and character development. Each of these subjects is treated simply and lucidly with adequate documentation, but without pedantry. Description of experiments, case illustrations and generous use of pictures make the presentation effective.

This book can be unqualifiedly recommended to the classes for which it is written. It should also be of value to individual parents if the publisher could arrange for a trade edition. C. M. LOUTTIT.

Indiana University.

CHARLES M. SMITH AND MARY M. ROOS. *A Guide to Guidance.* New York: Prentice-Hall, Inc., 1941, pp. 440.

Here is an ambitious attempt to present a detailed picture of the field of guidance in the secondary school. The following remarks from the Preface indicate the scope of the book: "Practical techniques for organizing and operating a guidance service are presented step by step. . . . It [the book] gleans from the field of measurement, the psychology of attitudes, facts of economics, and the practical procedures of 'guidance in action' pertinent data which are essential for a guidance program."

What is the authors' conception of the function of a guidance program? In Chap. I., Introduction, the following statements are found:

> Guidance today is concerned with the development of the "élite" in every talent classification, and with the continuous development of each individual's own best talents. Further, guidance is profoundly concerned with the degree of the individual's adaptability.
>
> Modern guidance emphasizes the need for analyses of current occupational trends and markets.
>
> The individual's attitudes, all of his attitudes, are also the concern of guidance.
>
> . . . a function of guidance at once becomes the stimulation and coördination of a school program whose goal will be to guide the individual student to ethical thought and action.
>
> . . . guidance must be on the watch for the inventive and inquiring mind.

This is indeed an Herculean task!

What are the qualifications for this super-man, the guidance counselor? Chap. 15, The Counselor in Person, is specific regarding the personality traits but vague regarding the training. The counselor should have "keen insight into human nature," must be mature, have a strong "but not striking" personality, be "sympathetic but not sentimental," "objective but not cold." He must have an analytical mind, sound judgment, and creative imagination. It would be helpful if the counselor had worked in "many different job environments." Regarding academic training the authors say: "Technical training should be equivalent to at least the training leading up to a master's or preferably a doctor's degree in some phase of the study of human relations."

Because of this cosmic conception of guidance the book discusses topics ranging from kinds of intelligence and their measurement to reorganizing the secondary school curriculum, and from how to make a local occupational survey to modifying student's attitudes. As a result of this variety of subjects the book is uneven—some topics are much more adequately presented than others.

Chapters 3 and 4, Intelligence and Occupational Effectiveness, reveal a naive faith in tests and the acceptance of dubious facts regarding psychological requirements for success in a given vocation. The climax of Chap. 4 is this gem: "A part of the secret of Rembrandt may well be sought in such a combination of high abstract intelligence and high manual dexterity." Chap. 7, Individual Attitudes and Drives, and Chap. 8, Guidance and Mental Hygiene, are superficial treatments of subjects that are beyond the scope of this book. Particularly annoying to this reviewer are the frequent success stories in these chapters of the following variety: Consider the case of John Doe who presented such and such a problem and today is . . . Chapter 2, Men at Work, and Chapter 13, Coöperative Education, are well-organized presentations of the occupational world today and the relationship of school to work in a coöperative training program.

Particularly valuable is the emphasis on general vocational training, *i.e.*, learning "working operations," a type of training which is a logical result of a highly mechanized industrial development. The most important contribution of the book is the authors' warning to vocational education that it must keep pace with an occupational world into which the student will be sent; therefore, the need for knowing what is happening in the economic realm and the need for revising the curriculum accordingly.

The book does not present "step by step" "Practical techniques for organizing and operating a guidance service. . . . " The authors have attempted to cover too much territory and as a result have produced a book that lacks organization and cohesion—it might more aptly have been named "Readings in Guidance."

STANLEY G. DULSKY.

Rochester Guidance Center.